AMERICAN
JOURNAL OF SURGERY

VOL. XXXIII. NOVEMBER, 1919 No. 11

SURGERY IN DIABETICS.

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There are few situations more delicate than that of the physician who has to assume responsibility for surgical intervention in a case of diabetes. Should the patient be operated upon? Is there less danger in temporizing than in operating? What anesthesia should be used? What pre- and post-operative treatment should be followed. These are serious questions, difficult to decide, because many points are not yet settled in spite of important contributions, by Becker, Naunyn, Ruff, Karewski, Berger, Poucel. I propose simply to state the problem and to present certain indications, based upon rather numerous observations.*

The main conditions rendering operations in diabetics dangerous are: 1, Hyperglycemia; 2, Acidosis. I do not mention the dangers due to vascular lesions, because while these occur frequently in diabetes, they are not essentially diabetic lesions; they are due to associated conditions (syphilis, arteriosclerosis, Bright's disease); gangrene due to endarteritis in the extremities does not occur in young subjects with severe diabetes, but in the moderate diabetes of stout subjects, suffering from venal sclerosis.

I. *Hyperglycemia.* Hyperglycemia favors suppuration. Some years ago, this was the main dread of the surgeons; Roser, Israel, König, had insisted upon the necessity of reducing the hyperglycemia before operation, by a suitable diet. Today suppuration is less feared; in aseptic operations it is rarely a fatal complication, numerous cases of healing by primary intention could be cited; in order to cause suppuration, there must be not only a predisposition, but bacteria, and the surgeon does not usually introduce them.

Complications resulting from hyperglycemia, while they often delay the cure, are practically never fatal. They can be prevented by reduction of the hyperglycemia and glycosuria, by appropriate diet; carbohydrate restriction. This preventive treatment is especially useful, when surgery is performed in areas like the perineum, subject to soiling by the urine.

When the surgeon is faced by suppuration (phlegmon, carbuncle, moist gangrene), requiring immediate surgical intervention, the hyperglycemia must be reduced as quickly as possible. It is here, that the absolute fast, with or without purgation is of great assistance; the aggravating action of fasting upon acidosis, should not be feared. This has been considerably exaggerated. I have observed cases of diabetic acidosis, in which fasting diminished the ammonuria and acetonuria.

II. *Acidosis.* This is a much more serious menace. It causes post-operative coma, and speeds the death of many diabetics. Hoffa has cited striking cases of post-operative coma, in cases which were sugar-free after diet. Death surpervened in one day, sometimes more slowly or occasionally at the end of several hours, the subject never awakening from the anesthesia and falling thus into coma.

Numerous conditions affect the course of post-operative acidosis; these are the severity of the diabetes, the nature of the operation performed, the anesthetic employed, and the treatment followed.

1. *The severity of the diabetes.* In diabetics, suffering from emaciation and acidosis, the slightest operations are dangerous; chloroform is almost fatal; a simple incision, even without anesthesia, may lead to coma.

In diabetics without emaciation, but in an attack of acidosis, the danger is also very great, but the resistance is better. Many such subjects survive after operations under general anesthesia.

In diabetics without emaciation or acidosis, coma, as a rule need not be feared; but it should not be forgotten, because operation under an anesthetic may cause the appearance of acidosis in a subject who did not present this symptom before operation. I saw such a complication, in a diabetic woman, who had been under chloroform one hour, for a perineorrhaphy. Before the operation, her urine contained no diacetic acid; at the end of the operation, a catheterized specimen of urine gave a strong Gerhardt reaction; for three days the patient was in danger, but thanks to energetic alkaline treatment, she recovered and several days later the acidosis diminished and then disappeared.

*Labbé, La chirurgie chez les diabetiques. Academie de Médecine, 19 Mai, 1914.

Thus the pre-operative condition of the patient assists in determining the prognosis. Three degrees of severity can be distinguished: 1, diabetes with emacination and acidosis; 2, diabetes without emaciation but with an attack of acidosis; 3, diabetes without emaciation or acidosis.

2. *The Nature of the Operation.* The nature and the gravity of the operation are conditions which influence the danger of acidosis. Extensive operative traumata and operations requiring a long time, are most to be feared. Pre-operative anxiety caused by fear of the knife may also play a part; I have seen one case in which such anxiety was the cause of a severe attack of acidosis in a diabetic without emaciation. Acetone rose from 0.32 to 0.51, and diacetic acid which was not present before, appeared in the urine. But, in fact, the anesthetic is more dangerous than the knife in operations upon diabetic subjects.

III. *The Anesthetic.* The most dangerous anesthetic is chloroform. It may even produce mild acidosis in non-diabetic subjects. Rolland has reported frequent acetonuria and occasionally diacetic acid in the urine, following chloroform anesthesia; Baldwin has seen acetonuria as a result of chloroform and other anesthetics. As a matter of fact, in subjects who have neither diabetes nor liver disease, acidosis is simply a matter of record; I have often looked for Gerhardt's reaction, without ever finding it.

From another angle, Nicloux, who has studied the decomposition of chloroform in the tissues, has reported that it is accompanied by extraction of alkali from the tissues in considerable proportion, with a consequent tendency to acidification. If the organism is healthy, it counteracts the acidosis and repairs the loss, but this does not occur when the organism is sick.

Even in diabetics without loss of nutrition, chloroform may produce acidosis. In cases presenting no emaciation and slight acidosis, chloroform aggravates the intoxication and may precipitate coma, but in any event recovery may take place; I have seen such a case recently,—a woman who underwent amputation of the forearm, necessitated by a very severe phlegmon, now has a perfectly healed wound; she still has glycosuria, but no acetonuria.

In diabetics with malnutrition and acidosis, chloroform is fatal. Chloroform should also be feared in subjects with liver lesions. The toxic action of chloroform on the liver has been ably demonstrated by the researches of Doyon, N. Fiessinger, Chevrier, R. Bénard and Sorrel, Rolland and the observations of Quénu. Severe icterus has been seen to follow chloroform anesthesia, and I have seen several cases of hepatic insufficiency with or without icterus, which caused rapid post-operative death; hepatic necrosis has been produced experimentally in animals, and finally the following substances have been found in the urine of patients operated upon under chloroform; urobilin, albumin, biliary pigments, acetone, glucose (or the possibility of provoking alimentary glycosuria by ingestion of sugar); these are indications of serious functional disturbances of the liver. The tendency of chloroform to injure the liver, is one of the chief reasons for the gravity of operations upon this organ.

Ether is supposed to have to have a less toxic action than chloroform. But one cannot depend on this, for I have seen ether cause the death of a patient, a diabetic, without emaciation, but in an attack of acidosis, for whom the most careful pre- and post-operative precautions had been taken.

Prolonged ethyl chloride anesthesia seems to be the best tolerated by diabetics. I have seen a diabetic without emaciation, withstand remarkably well an anesthesia lasting 55 minutes, under ethyl chloride, for mastoidectomy; he had previously shown traces of diacetic acid in the urine; not only was he free of post-operative complications. but the day after the operation the diaceturia was no longer present.

Boureau, who has had wide experience in prolonged ethyl chloride anesthesias, told me that he had anesthetized 17 diabetics by this method. Six of these had acetonuria. The operations were of a serious nature lasting twenty to sixty minutes, and requiring the use of 35-100 cc. of ethyl chloride. A number of these patients were of advanced age. In spite of all this he had not a single death.

Spinal anesthesia by lumbar injection of cocaine or novocain is preferable to ether or chloroform in diabetics.

It was well withstood by a patient who underwent disarticulation at the knee for gangrene. No reaction of acidosis appeared in the urine.

Local anesthesia, by means of the subcutaneous injection of cocaine or stovaine, or novocain is the method of choice to be employed in cases of diabetes. I have seen it well tolerated by many patients. It does not provoke acidosis. Professeur Réclus has told me that he obtained excellent results with it, in amputations upon diabetics.

IV. *Pre-operative and Post-operative Treatment.* Vegetable diet (dry legumens, oatmeal) or milk diet, either of which counteract acidosis; the administration of a large dose of bicarbonate of soda before the operation may diminish the danger of

acidosis. The following case observed at the Dubois hospital furnishes a good example. This diabetic with acidosis had to undergo at a few days interval, two successive amputations, for gangrene of two toes. The two operations were identical. The first time I gave him 30 grams of bicarbonate of soda before the operation. The result was excellent; the second time this precaution was negnected and the patient went into coma and died.

It has been suggested that preventive injections of glucose be given to combat acidosis; this may be of use in healthy subjects who can utilize the glucose, but in diabetics who do not burn the sugar, I see no advantage; on the contrary it seems quite disadvantageous.

Surgeons seem to be agreed on this point,—not to subject patients about to be operated upon to an unnecessary fast. Certain of them even give preoperative doses of sugar, in non-diabetic subjects.

Even if the main lines of prognosis are known, it does not follow that cases always take the cause indicated in the examples given. There are always unforeseen accidents and successes, in as much as we are still in ignorance of many of the conditions affecting acidosis. However, one cannot be too careful or too cautious, or too conservative about surgical intervention and especially of general anesthesia in diabetic patients.

Conclusions. The following rules seem to me to be the best guide in cases of diabetes where surgical intervention is necessary.

1. Only those operations should be performed which are absolutely necessary. Particular caution should be used in cases with acidosis. However, it is better to operate, than to allow an infection to become generalized which may kill the patient by septicemia or the acidosis which it provokes.

2. The operation if not urgent, should be preceded by treatment directed against the hyperglycemia and the acidosis. The treatment has the following basis: 1, mixed diet with little meat and reduced carbohydrate (if there is no acidosis) so as to reduce the hyperglycemia; 2, diet of dry vegetables or oatmeal, or milk if there is acidosis; 3, the administration of bicarbonate of soda in sufficient dosage to render the urine alkaline.

3. Immediately before the operation the fast should be lifted. The patient may also be given 40 grams of bicarbonate of soda.

4. The choice of anesthetic is of great importance. The following are preferred: Local anesthesia with cocaine or its substitutes; if this is impossible, spinal anesthesia; if general anesthesia is necessary use ethyl chloride; in cases of diabetes with acidosis neither chloroform nor ether should ever be used.

5. After the operation, bicarbonate of soda should be given by mouth, or if this is impossible by intravenous injection in sufficient quantity to render the urine alkaline. If there is severe acidosis 100 grams may have to be given. As soon as the patient can eat, he should be given vegetable broths, oatmeal soup, purées of dry vegetables, or milk. The alkaline treatment should be continued until all reactions of acidosis have disappeared.

THE TREATMENT OF MAXILLO-FACIAL INJURIES IN THE ZONE OF THE ADVANCE.

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During the time the junior author served in the British Expeditionary Force in 1915-1916, a certain period was spent in a Base Hospital devoted almost exclusively to the treatment of jaw injuries.

When these cases were received, it was often days after injury, due to lack of cooperation in the transportation of this class of cases. The startling fact was that when admitted to this hospital the fractured jaw cases had been given no previous treatment. Cases of fracture of other parts of the body arrived in this same base area with splints applied.

The reasons for this were obvious:

1. No men properly trained in the treatment of fractured jaws were assigned to Casualty Clearing Stations.

2. While the principle of the treatment of fractured jaws differs in no way from that of other parts, viz. early reduction and fixation of the bony parts, the application is not so simple. There is no standard splint that can be applied.

With this experience as a basis, as well as what we learned from the Paris base hospitals later, especially the American Ambulance at Neuilly, we determined to bend our efforts to earlier treatment of fractured jaws than had hitherto been attempted.

During the months of June and July, 1918, Evacuation Hospital No. 8, was stationed at Juilly, not far from Paris, and we had occasion to visit the hospitals in Paris to which many of the wounded of the Belleau Woods affair and the Second Battle of the Marne had been evacuated. We were especially interested in learning what we could of

jaw and face surgery. We were much impressed by the big, gaping and infected face wounds, associated with fracture of the upper or lower jaw. The junior author had spent nine months with Major Kazanjian in General Hospital No. 20—a British hospital—and we were very much interested in the entire subject.

It was noticed that these wounds behaved badly, they were heavily infected, there was much sloughing with consequent loss of tissue that could ill be spared, and that great retraction of the wound edges took place. All this required in many cases repeated plastic operations before a good result could be obtained. This made for a long convalescence, with oftimes considerable deformity and consequent disfigurement.

We therefore decided to undertake, if possible, an immediate surgical treatment of these cases in our own service, which was an Evacuation Hospital near the front.

In August we were sent to a new station near Verdun, and were behind the American Armies during the entire offensive that began with the reduction of the San Mihiel salient September 12th and continued until the armistice on November 11th. During this time Evacuation Hospital No. 8, was receiving seriously wounded men, and admitted 6,200 wounded, among whom there were 43 with fractured jaws. In practically all of these the fracture was associated with injury of the adjacent soft part, sometimes a small wound, but often a large and extensive one. One of the first things to impress us was that no matter how extensive the wound in the soft parts or how wide the separation, there was rarely any considerable loss of substance, but the defect was caused chiefly by retraction of the wound edges. Most of these men reached us within 18 hours of the receipt of injury and many of them much earlier. In all cases of suspected fracture of the upper or lower jaw the junior author was called at once in consultation. If the jaw was fractured and there was accompanying injury of the adjacent soft parts, some form of splinting was applied and the soft parts were immediately repaired. These two proceedings will be taken up separately, to which will be added a report of the cases and some conclusions therefrom.

We regret very much the lack of photographs, but the machinery of an evacuation hospital during an offensive will not tolerate delay. Its efficiency depends upon many things, of which speed is not the least important.

Between October 1st and November 11, 1918, forty-three cases of fractured jaws were admitted to Evacuation Hospital 8, A. E. F. Of these, thirty-seven were of the mandible, one of the maxilla, and five involving both the mandible and maxilla.

FIXATION.—When time permitted permanent splints were made, and twelve cases were evacuated to base hospitals with apparatus of a permanent character in place.

As soon as patients had been admitted, they were immediately radiographed. At first only flat plates were available, but Capt. Alleman later was able to secure a stereoscope, which gave more definite information. In the operating room the wounds were thoroughly examined and the method of treatment was decided upon. In all cases dependent drainage was provided if not already established, and foreign bodies were removed.

The method of fixation used depended upon circumstances existing in the hospital, and the problems presented by the cases themselves. It is impossible to lay down rules for the reduction and fixation of fractured jaws. Each case must be considered individually. As stated, in twelve cases permanent splints were adjusted. These were metal band and wire splints, and vulcanite splints.

In eleven cases the injuries were at the angle of the mandible, and the lower jaw was wired to the upper jaw with the teeth in occlusion.

In several cases, especially where the tongue was swollen, temporary open bite splints were applied.

In fractures of the maxilla, Kingsley splints with extensions, extra-buccally, connected with head-gear, were used.

In cases of extensive wounds of soft parts, immediate reduction and temporary fixation of bony parts were secured. Heavy arch wire of german silver and brass orthodontia wire were used. Often when these were partly in place, the final adjustment was left until the post-operative period of nausea had passed, when they were tightened up. After fixation the plastic operation of soft parts was performed. As soon as the sutures could be removed, the temporary apparatus was replaced by one of a more permanent character, or the patient was evacuated to a base hospital where it could be done.

The splints used were those which could be easily and quickly made, and in fact all the work was made as simple as possible.

It is not feasible to keep cases of fractured jaws in an evacuation hospital for more than a few days,

chiefly on account of the difficulties of providing suitable diet, as well as the routine care.

Two factors that helped greatly in this early treatment were, the changed character of the warfare, more open fighting and consequently fewer injuries with great loss of tissue, and the fact that the American soldiers had much better teeth than the British soldiers. Too much emphasis cannot be put on this latter fact, for our best guide is the occlusion of the teeth. Splints and wires are attached to the teeth, and when these are missing it complicates matters considerably.

REPAIR OF SOFT PARTS.—There are four great enemies to be overcome in war surgery—shock, hemorrhage, infection by anaerobes, and infection by the streptococcus pyogenes. In maxillo-facial injuries uncomplicated by other wounds, both shock and serious hemorrhage are unusual. There was not a single case of gas infection clinically in our service, in any injury above the clavicle. Most of them showed anaerobes in cultures taken from the wound before operation. Infection by pyogenic organisms and especially the streptococcus was almost entirely controlled by dependent drainage. This is a most important matter and should always be instituted. In our series there was not a single instance of infection requiring secondary operation and no case of secondary hemorrhage.

After application of the temporary splint the patient was anesthetized with ether through a tube in the nares. A careful study of the soft parts was made and a plan of procedure mapped out. This was important in extensive injury.

The preparation consisted in shaving the skin, cleaning with benzine, ether and the application of iodine. The skin edges were carefully debrided with straight sharp scissors, care being taken not to sacrifice any particle however small. The entire depth of the wound was then debrided, care being taken to follow all ramifications. Curved Mayo scissors were found best for this. All bleeding points were carefully ligated with fine catgut. The mucous membrane surface was usually closed with chromic catgut, leaving the knots in the wound. The muscle was loosely sutured with plain catgut. The skin was closed with silver wire interrupted retention sutures, and the skin edges approximated with interrupted fine silk suture.

A most important matter is the removal of tension from the wound edges. On the successful accomplishment of this depends in very large measure the success of the procedure. This was done with the use of the Tiffany harelip buttons.

CASES OF JAW FRACTURE AT EVACUATION HOSPITAL NO. 8.

September-November, 1918.

[Army Abbreviations: G. S. W.—"gunshot wound" by any missile, including shell fragment. F. C.—compound fracture. F. C. C.—compound, comminuted fracture. M. G.—mach ne gun. F. B.—foreign body.]

1. October 17, 1918. Lt. Hanson, Capt. Foote, Lt. Dillon. Admitted September 27. G.S.W. face; F.C.C. of mandible with considerable loss of tissue, loss of teeth on right side from median line to second molar. Lacerated wound of lower lip. Contracted erysipelas. Remaining teeth wired in as good occlusion as possible. Patient ordered to be evacuated to special head hospital at Vichy by Major Schaefer.

2. October 16, 1918. Maj. Shipley, Lt. Dillon. Admitted October 15. G.S.W. right leg and face. M.G. bullet. F.C.C. of mandible right side; very little loss of tissue; fairly large wound on right cheek. Jaws wired together with teeth in good occlusion. Drainage by tube at entrance wound on left side of face.

3. October 11, 1918. Lt. Hanson, Lt. Cronan, Lt. Dillon. Injured October 10, admitted October 11. G.S.W. left side of face; fracture of mandible left side at bicuspid region; very little loss of tissue. Jaws wired together with teeth in occlusion.

4. October 24, 1918. Maj. Shipley, Lt. Reier. Injured October 24, 8 A. M. Admitted October 24, 4 P. M. G.S.W. left side of face perforating mouth; loss of teeth and tissue; F.C.C. of mandible from left cuspid to third molar. Remaining teeth wired together in occlusion for evacuation.

5. October 29, 1918. Maj. Shipley, Lt. Dillon. Injured October 23, 6 A. M. Admitted October 23, 2 P. M. G.S.W. Multiple fracture of lower jaw; line of fracture between left lateral and cuspid, also between right cuspid and first bicuspid. Middle fragment wired to temporary splint and attached to two posterior fragments. This middle fragment was pushed lingually and lay under the tongue. It was brought forward and wired to the other teeth approximating it, and the teeth of the posterior fragments wired to those of the upper jaw for firmer occlusion.

6. October 26, 1918. Capt. Webb, Lt. Dillon. Injured October 24, 1 P. M. Admitted October 25, 2 P. M. G.S.W. neck, lower jaw, upper jaw and nose, perforating. F.C.C. of mandible posterior to lower last teeth left side, and F.C. of upper maxilla left side. Jaws wired together with teeth in occlusion. Tight bandage to be applied on account of this upper fracture.

7. October 9, 1918. Lt. Dillon. Admitted October 9. G.S.W. right side of face; inferior maxilla fractured. G.S.W. lower right side of face; mandible fractured in bicuspid region. Teeth wired together in occlusion.

8. October 14, 1918. Maj. Shipley, Lt. Dillon. G.S.W. lower jaw and neck. Fracture of mandible at symphysis; laceration of floor of mouth, grazing tongue; ragged hole of exit at side of neck; entrance through chin. Band and wire splint wires lingually and labially and bands on the four lower

bicuspids. Eight splints cemented in place. Barton bandage.

9. October 20, 1918. Lt. Dillon. Injured October 12, 11 A. M. Admitted October 12, 11 P. M. G.S.W. face and lower jaw; extensive laceration of the chin; entire mental process separated from mandible; attached large skin flaps involving entire thickness of the skin and upper part of neck. F. C. at region of second bicuspid and F.C.C. from bicuspid region with extensive loss of tissue and teeth around to right inclusive of right cuspid. F.C. at left angle. Jaws wired together with teeth in occlusion.

10. October 13, 1918. Maj. Hennington. Admitted October 9. G.S.W. face and shoulder; F.C. mandible, right cuspid region. Loss of teeth but very little loss of bone. Band and wire splint bands on lower right first bicuspid and first molar and on lower left two bicuspids and second molar and cemented in position.

11. October 15, 1918. Lt. Dillon. Injured October 1. Admitted October 4. Evacuated October 15. G.S.W. face; F. C. C. lower jaw; loss of teeth on left side up to median line; comminution and loss of bone and of lip tissue. Lower jaw temporarily wired to upper for evacuation to special head hospital as ordered by Major Schaefer.

12. October 31, 1918. Lt. Dillon. G.S.W., F.C.C. at left bicuspid region. Temporary open bite splint applied.

13. October 13, 1918. Lt. Dillon. G.S.W. neck and both shoulders; F.C. lower jaw, with considerable loss of bone and teeth in anterior region. Temporary open bite splint applied.

14. October 16, 1918. Lt. Hanson, Lt. Dillon. Injured October 3. Admitted October 4. G.S.W., F.C.C. mandible, anterior region. Laceration of lower lip. Held for observation on account of suspected fracture at base of skull. Cerebro-spinal fluid apparently running from right ear. F.B. in left arm. F.B. in left side of chest wall. F.B. in left thigh. Facial paralysis on right side. Remaining teeth of lower jaw wired to teeth of upper jaw temporarily for evacuation.

15. October 9, 1918. Lt. Dillon. Injured September 29, 10 A. M. Admitted September 29. G.S.W. chin; fracture mandible between lateral and central incissors. Band and wire splints cemented in place October 3 from left bicuspids to right bicuspids.

16. October 17, 1918. Lt. Dillon. Admitted October 11. G.S.W. face, perforating from right cheek to left neck; F. C. C. lower jaw. Fractures at median line and between second bicuspid and first molar on right side. Temporary open bite splint applied.

17. October 16, 1918. Maj. Shipley, Lt. Dillon. Injured October 14. Admitted October 15. G.S.W., F.C.C. mandible right bicuspid region; tongue badly lacerated and swollen. Temporary open bite splint applied.

18. October 11, 1918. Lt. Hanson, Lt. Dillon, G.S.W. right side of face; fracture mandible, right side posterior to last tooth. Jaws wired together with teeth in occlusion.

19. October 8, 1918. Lt. Dillon. G.S.W. right side of face and neck; fracture at right angle of jaw but not confirmed by *x*-ray. Teeth immediately wired in occlusion. G.S.W. right side of face and neck perforating one end at angle of jaw, other at angle of mouth. Enormous swelling of face and neck; mouth and tongue covered with sordes. Consultation decided anesthetic inadvisable. (Maj. Weeks.)

20. October 10, 1918. Lt. Dillon. G.S.W. fracture mandible, left side, posterior to last tooth. Right displacement downward of mandible, left side. Jaws wired together with teeth in occlusion.

21. October 11, 1918. Lt. Dillon. G.S.W. left parotid region, entrance; exit right; fracture of mandible, left side posterior to last tooth. Jaws wired together with teeth in occlusion.

22. October 26, 1918. Maj. Hennington, Lt. Dillon. Injured October 24. Admitted October 24. G.S.W., F.C.C. mandible at right angle. Teeth wired together in occlusion.

23. October 27, 1918. Lt. Col. Evans, Lt. Dillon. Admitted October 25. G.S.W., F.C. mandible, left angle; multiple F.C. superior maxilla. Great loss of spongy tissue and teeth of superior maxilla. Remaining fragments have very little attachment. Closed bite temporary splint holding fragments in probable alignment with lower teeth. Open above to allow for drainage. Tight Barton bandage applied with force directed toward right side to offset displacement of mandible.

24. October 29, 1918. Maj. Brickner, Lt. Dillon. Injured Otcober 23, 10:30 A. M. Admitted October 24, 10:30 A. M. G.S.W., F.C.C. mandible. Line of fracture at right side posterior to existing teeth. Jaws wired together with teeth in occlusion.

25. October 13, 1918. Lt. Dillon. Injured October 12, 8 A. M. Admitted October 12, 2 P. M. G.S.W. perforating left jaw, left shoulder; F.C.C. at left angle of jaw; F.C.C. left scapula. Bullet ranged downward. F.C.C. of jaw with injury to facial muscles. Gauze drainage. Jaws wired together with teeth in occlusion. Gauze drainage because of orders regarding dependent drainage in jaw fractures.

26. November 1, 1918. Maj. Shipley, Lt. Dillon. G.S.W., F.C.C. mandible, extending from left cuspid to right second molar with loss of teeth and bone between and extensive loss of soft tissue. Temporary band and wire splint on lower jaw, and lower jaw wired to upper with parts in fairly good position. At time of evacuation wound and mouth clean.

27. November 8, 1918. Maj. Shipley, Lt. Dillon. Injured October 5, 11 A. M. Admitted October 6, 1 P. M. G.S.W. lower jaw; F.C.C. mandible between left central and lateral; comminution at symphysis; some loss of bone; mental process fractured off, comminuted. Small fragments of bone removed. Large fragment left, soft parts debrided, closed with drainage. Band and wire splint; bands on lower four bicuspids and wire labially. Inferior fragments right side fractured longitudinally; silver wire passed around the fragments and wired up to the splint.

28. November 11, 1918. Lt. Levin, Lt. Dillon. Admitted November 11, 6 P. M. Duration of injury, 8 hours. G.S.W., F.C.C. upper jaw left side; wound penetrating into antrum. Temporary interdental splint applied before plastic operation. (Lt. Dillon.) G.S.W. of face entering over molar, bone going downward through middle upper lip. F.C.C. superior maxilla; anterior wall of antrum collapsed, comminuted; about two-thirds of upper lip absent. Mucous membrane of mouth torn in shreds. Mucous membrane replaced, making a vestibule on the left side of mouth. Skin edges freshened and sutured with silk, mucous membrane with catgut. Still a large defect in upper lip. Wound painted with iodine. G.S.W. perforating right index finger. Iodine dressing, local anesthetic (novocaine). Chin cup and head gear attachment. Chin cup attached to head gear by elastics on both sides to relieve the pull of muscles downward. Barton bandage.

November 8, 1918. Lt. Dillon. Fracture, accidental, in median line of mandible. Jaws wired together with teeth in occlusion.

30. Lt. Dillon. F.C.C. mandible between right second biscuspid and first molar, also on the left side bicuspid region, with fracture of alveolar process of upper left side of maxilla. Teeth of lower jaw wired to the upper jaw in good occlusion.

31. November 10, 1918. Maj. Bruggeman. Wounded November 10, 11 A. M. G.S.W., F.C.C. mandible, left side. Incision under local anesthetic of left side of jaw to release tension. (Maj. Bruggeman.) Loss of teeth between cuspid and molar region. Temporary open bite splint applied with Barton bandage. Mouth very clean at time of evacuation.

32. Admitted November 10, 1918. Maj. Hennington, Lt. Dillon. G.S.W. just below angle right jaw with large wound of entrance and two foreign bodies in contact with fractured jaw. Removal of two F.B. and cleansing of wound. (No anesthetics.) Lower jaw wired to upper jaw with teeth in occlusion.

33. Maj. Bruggeman, Lt. Dillon. Fracture posterior to existing teeth on right side of mandible. Lower jaw wired to the upper of the remaining teeth in occlusion. Soft tissue sutured with drainage.

34. November 13, 1918. Capt. Chaffee, Lt. Dillon. Injury 7 hours old. G.S.W., multiple, left side of face; F.C.C. mandible left side between first and second molar; one of wounds of face perforating into the buccal cavity. One suture through mucous membrane, closing opening into buccal cavity. Wounds superficially debrided. Much dirt and gravel removed. Gauze drain into each. No teeth lost. Jaws wired together in good occlusion. Barton bandage.

35. October 15, 1918. Maj. Weeks, Lt. Dillon. Injured October 11. Admitted October 12. G.S.W., F.C.C. mandible at symphysis; little loss of tissue. Band and wire splint: band around right lateral cuspid and first bicuspid and left lateral cuspid and wire attached labially and cemented in place.

36. October 16, 1918. Lt. Hanson. G.S.W. face and left shoulder; F.C.C. mandible at symphysis region. Band and wire splint; bands on lower cuspids and wire labially, and cemented.

37. October 31, 1918. Maj. Brickner, Lt. Dillon. Admitted October 17. G.S.W. face, entrance left parotid region, below zygoma; two large shell fragments buried in naso-pharynx, right side; transmitted fracture at left condylar region of mandible, displacement to left side. F.B. removed (Maj. Brickner). Band and wire splints on both jaws and a tube and wire arrangement to prevent displacement to left, with elastic bands between the two splints to allow some movements to prevent ankylosis.

38. October 11, 1918. Lt. Dillon. Injured October 1. Admitted October 1. G.S.W. right side of face; fracture both upper and lower jaws. Fracture of mandible at right angle. Fracture of superior maxilla with loss of tissue on right side from second bicuspid posteriorly, on left side loss of tissue in first molar region. Removable vulcanite inter-dental splint on anterior teeth of both jaws with closed bite on account of fracture of mandible and not extending posteriorly to allow for extensive irrigation necessary. Splint supported from external appliance on head attached to wings extending externally from splint. Additional support to lower jaw by tight bandage. Extensive face wound with loss of soft tissue and very septic on arrival, but comparatively clean at time of evacuation.

39. September 26, 1918. Lt. Dillon. Injured September 26, 1 A. M. Admitted September 26, 3 P. M. G.S.W. face; fracture mandible, at left angle complete; fracture mandible at left second bicuspid region, incomplete. Facial wound closed immediately after admission. Pus draining into mouth October 2, at lower left bicuspid region.

40. October 10, 1918. Lt. Dillon. Injured September 26. Admitted September 26. G.S.W. neck; entrance below angle of jaw, right side; exist left mental region. Loss of teeth from second molar left side to right central. Considerable loss of bone in this area. Enough bone left to form a continuous lower border of the mandible in spite of fracture. Mouth remarkably clean at time of evacuation. Drainage from beneath angle of mandible at right side and mental region left side.

41. October 27, 1918. Maj. Shipley, Lt. Dillon. Admitted October 27. Duration of injury, 14 hours. G.S.W. neck and face, perforating. F.B. located by *x*-ray not found. Fracture both superior maxilla. Extensive laceration, hard and soft palate. Right maxilla largely removed. Soft palate detached and hanging in naso-pharynx, obstructing respiration. Sutured back in position as well as possible. Wound behind angle of left side of lower jaw enlarged and drainage made through this wound. Lower jaw not fractured. Nasal cavities largely destroyed. Packed through mouth (Maj. Shipley). Late re-examination by *x*-ray shows fracture of the mandible at median line, little displacement, also probable fracture at the angle, left side. Fracture of the maxilla, right side, between second bicuspid and first molar. To

bring about reduction of parts to proper relations probably requires gradual methods. Therefore, no apparatus has been made.

42. October 15, 1918. Maj. Brickner, Lt. Dillon. Admitted October 14. G.S.W. chin; F.C.C. mandible at left bicuspid region; F.C. alveolar process extending forward to incisor teeth. Lower jaw wired temporarily to upper jaw with teeth in good occlusion.

43. October 17, 1918. Maj. Shipley, Lt. Dillon. Injured October 10, 9 A. M. Admitted October 10. G.S.W. perforating face, tongue and lower jaw; F.C.C. mandible, bilateral, anterior to angles. Wound through left cheek, tongue and into right cheek. Large éclat removed from right cheek. Jaws wired together with teeth in good occlusion.

CONCLUSION.—The treatment of maxillo-facial wounds near the front in an Evacuation Hospital permits the earliest possible application of a splint, *i. e.*, early reduction and fixation of bony parts. When this is done, immediate plastic operations on soft parts can be accomplished with no subsequent breaking down. In this way sepsis is greatly reduced; secondary hemorrhage is nearly eliminated; loss of tissue is much lessened; the patients arrive at Base Hospitals in good condition; the period of convalescence is lessened; and there is less disfigurement.

ARTIFICIAL RESTORATIONS AFTER THE SURGICAL REMOVAL OF PORTIONS OF THE MAXILLA OR MANDIBLE.

VETHAKE E. MITCHELL, D.D.S.,
NEW YORK CITY.

Deformities of the oral cavity produced by the necessary surgical removal of portions of the maxilla or mandible, are many and of various extent.

While the life of the patient has often been saved by operation, the loss of these tissues produces a condition in which life is of little joy to the patient.

The deformity is often very unsightly, and the speech is so defective as to be almost unintelligible. The function of mastication and deglutition in many cases is so badly impaired as to be almost useless.

In the reconstruction of these conditions, mechanical means are resorted to, as surgery can be of little assistance. The materials used as substitutes for the missing tissues, are gold, hard rubber and porcelain.

The principle involved in reconstruction, is to restore, as nearly as possible, the normal shape and size of the missing tissues, so as to allow normal functioning. The factors to be considered in these restorations are, mastication, speech and appearance, in the order named, as to importance.

The illustrations and description of the treatment of a few cases will probably be the best method of presenting this subject.

Fig. 1. Case I—Defect after removal of superior maxilla.

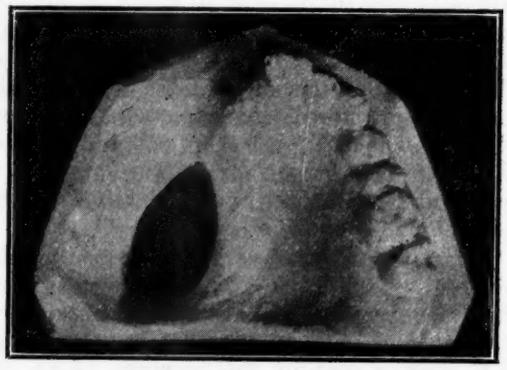

Fig. 2. Case I—Plaster model of defect.

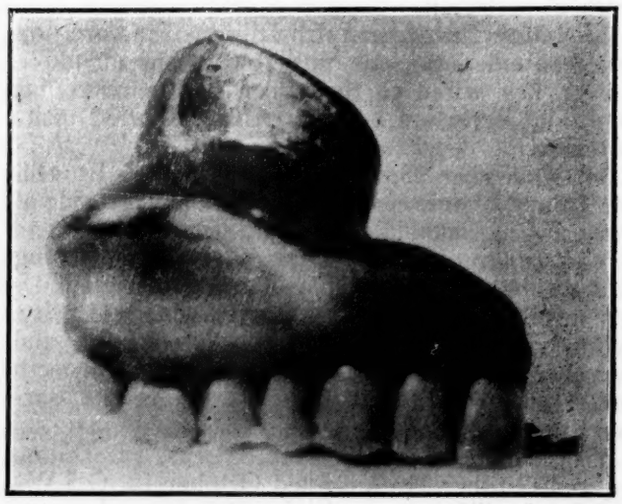

Fig. 3. Case I—Prosthesis of hard rubber, with porcelain teeth.

CASE I. Male, age 45. Sarcoma of the right superior maxillary bone. Entire bone removed, from

the median line, including all the teeth on that side. (Figure 1.)

Figure 2 is of a plaster model of the upper jaws showing the loss of tissue and the large opening into the nasal passage. Speech was very much af-

Fig. 4. Case I—Prosthesis in place.

fected, and the deformity of the face was very noticeable owing to the drawing in of the cheek on that side.

The restoration was made of hard rubber, attached to the remaining teeth by means of gold removable attachments, and all missing teeth were replaced with porcelain ones. (Figure 3.) The great loss of tissue necessarily made the restoration bulky, but as it was hollow its weight was not

Fig. 5. Case II—Defect after removal of both superior maxillae.

more than that of an ordinary dental plate. By restoring the roof of the mouth and the floor of the nose, speech was almost immediately restored The cheek was held out to almost its normal outline. (Figure 4).

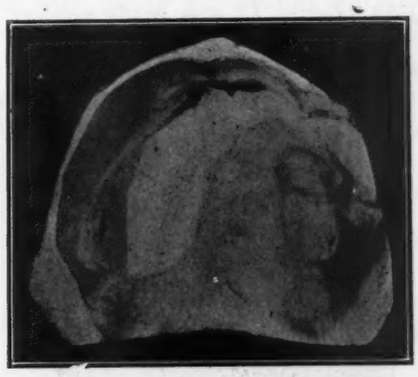

Fig. 6. Case II—Plaster model of upper jaw.

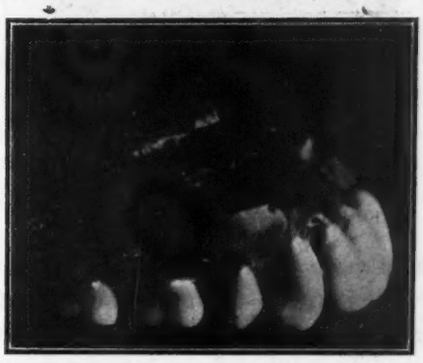

Fig. 7. Case II—Prosthesis

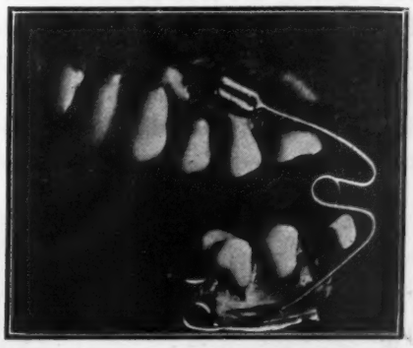

Fig. 8. Case II—Prosthesis with supporting spring

Fig. 9. Case II—Before inserting prosthesis.

CASE II. Male, age 45. Sarcoma of the superior maxillary bones. Right superior maxilla removed

and the left, as far back as the second molar tooth. All teeth removed. (Figure 5).

Figure 6 is of a plaster model of the upper jaw. Restoration (figure 7) was made similar to that in Case I.

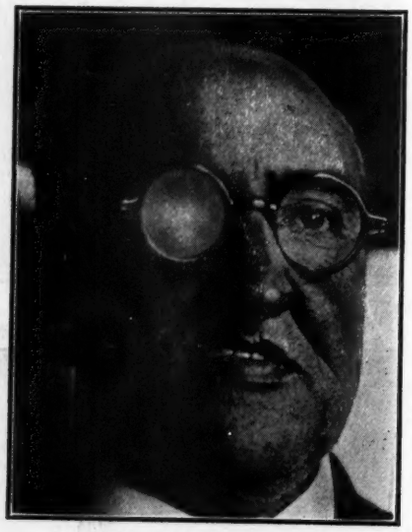

Fig. 10. Case II—Prosthesis inserted.

As there were no teeth to attach to, and no support to be had from the remaining tissues, it was necessary to devise some means to hold up the appliance. This was done by attaching to the prosthesis a spring, the free end of which slid in an open gold sleeve, fastened to a small plate made for the lower jaw to replace the two missing teeth on the left side. (Figure 8). The tension of the spring was sufficient to hold the appliance in position when the mouth was opened.

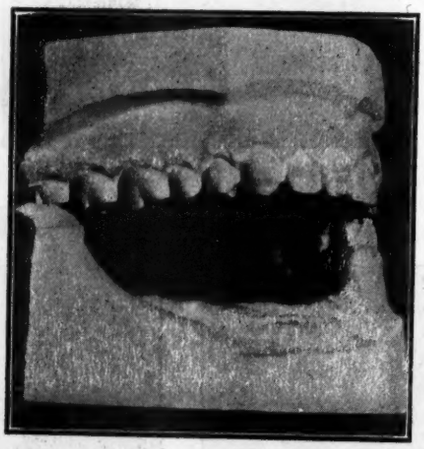

Fig. 11. Case III—Model of defect in mandible.

Figure 9 shows profile and front views of the patient without the appliance and figure 10 a frontal view with the piece in place.

CASE III. Male, age 32. Necrosis of the mandible, extending from the first bicuspid on the left side around to the ascending ramus on the right side.

Figure 11 is of a plaster model of the mouth, showing the loss of tissue. A regeneration of bone had taken place.

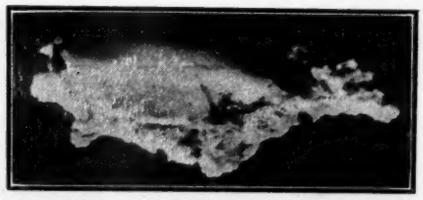

Fig. 12. Case III—Sequestrum removed from mandible.

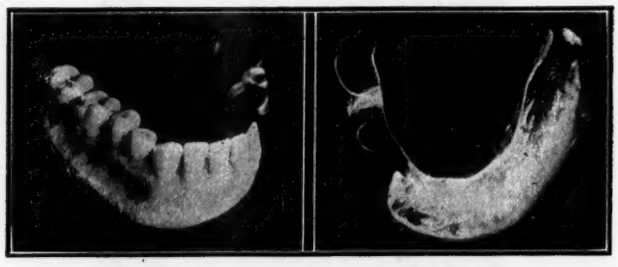

Fig. 13. Case III—Prosthesis.

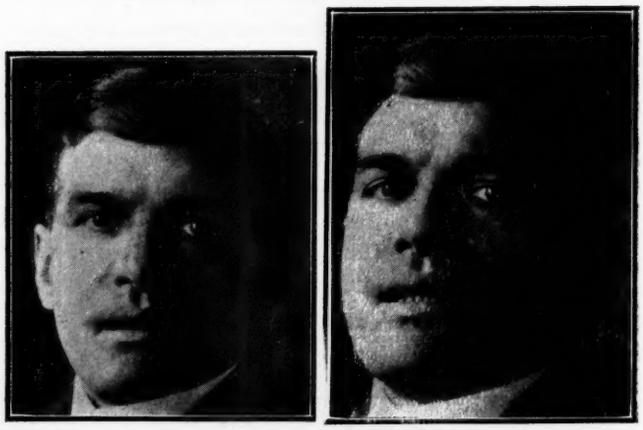

Fig. 14. Case III—Before and after inserting the prosthesis.

Fig. 15. Case IV—Model showing loss of tissue.

Figure 12 is of the sequestrum that was removed. Figure 13 shows two views of the restoration.

Figure 14 shows the patient without and with the restoration.

CASE IV. This is an exceptional case, that of a boy, age twelve, with uvula and a portion of the soft palate accidentally sacrificed in an operation to remove adenoids and tonsils, at eight years of age.

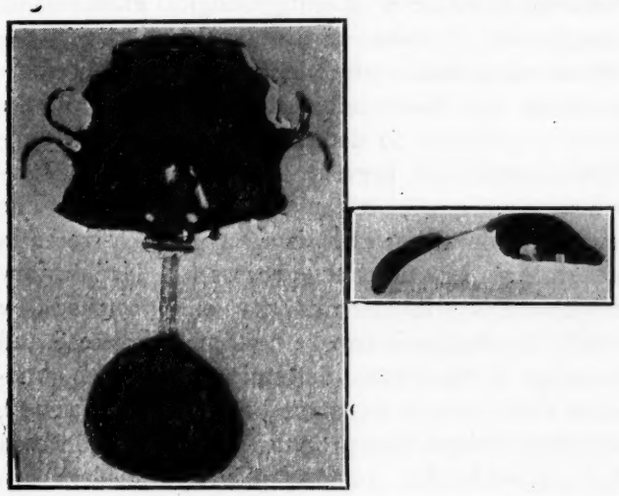

Fig. 16. Case IV—Prosthesis for defect in soft palate.

Figure 15 is of a plaster model showing the lost tissue. Figure 16 shows two views of the appliance constructed for this case.

As speech had not been fully developed at the time of the accident, and as nothing had been done for the child in this direction for four years, the restoration of speech was almost as difficult as in a congenital cleft-palate case.

17 EAST 38TH STREET.

EMPYEMA THORACIS.

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The recent epidemic of influenza has taught us that empyema, or pyothorax, may sometimes be a primary infection, instances having been observed where no other intrathoracic disease could be demonstrated either clinically or at necropsy. In such cases the route by which the pyogenic bacteria reach the pleural cavity is problematical; it may be from a distant focus of infection through either the blood stream or the lymph channels, or both. It hardly seems reasonable to suppose that virulent germs could migrate from the lung or other adjacent viscera to the pleura and there induce inflammatory reaction with the production of purulent fluid, without causing similar change in the other structures, although this method of pleural infection has been suggested on the basis that "the pleural membranes may be a more suitable soil" than obtains elsewhere.

Ordinarily empyema has been regarded as a complication of other existing disease, and this is true in the majority of cases; thus it may be secondary to any disease involving the intrathoracic viscera; it may follow perforating gunshot or stab wounds of the chest; it may be a sequel to violence externally applied. Pleurisy with effusion from any cause may become empyema by the invasion of pyogenic bacteria. More often than otherwise, however, it is noted as a complication of bronchopneumonia. The most serious cases are those in which the streptococcus hemolyticus is the responsible organism, and this was true in the majority of the pneumonias that followed measles and influenza during the epidemic of 1917 and 1918. In nearly all these cases the hemolytic streptococcus was found during life, not only in the pleuristic fluid but also in the blood stream; and examination of various structures at autopsy revealed the presence of organisms of the same types. This led to the assumption that pneumonia and empyema due to infection by the streptococcus hemolyticus must simply be part of a general bacteremia or septicemia. A rather significant fact was that autopsies upon patients dying from this type of pneumonia with empyema disclosed multiple abscesses in various portions of the body, also encapsulated abscesses in various portions of the lung, which showed hemolytic streptococci. Of course, under such circumstances it would be impossible to determine whether the empyema owed its origin to the pneumonic process, or whether it was secondary to a pre-existing focus of infection located elsewhere in the body.

It is a strange commentary that in the earliest stage of the affection the pleuritic fluid on examination is usually shown to be serous and oftentimes no microörganisms can be demonstrated, but within a few hours or days it becomes distinctly purulent in character due to invasion of pyogenic bacteria. This fact has suggested the idea that pyogenic organisms are always secondary invaders and not primary causative factors in the production of empyema. However, it must not be forgotten that clinically the line of demarcation between simple pleuritic effusion and empyema cannot be clearly and positively defined excepting by frequent thoracentisis and bacteriological examination of the fluid thus withdrawn, and this practice would be unjustifiable in the absence of clinical manifestations demanding such procedures.

A characteristic feature in the majority of empyema cases observed in military practice during the epidemic of pneumonia following influenza

and measles was that the accumulation of fluid was exceedingly rapid. Sometimes during the interval between examinations (three to six hours) there would be noted a decided change in the clinical picture owing to the rapidity with which the fluid increased in quantity and purulence. Bacteriological examination of the fluid withdrawn at various times disclosed the presence of different types of bacteria, the order of their frequency being: (a) pneumococcus, (b) streptococcus and streptococcus hemolyticus, (c) micrococcus catarrhalis, (d) staphylococcus, and (e) tubercle bacillus.

It will be thus noted that the predominating organisms were the pneumococcus and the streptococcus hemolyticus, the latter being the most virulent of the streptococcus group, which probably accounted for the severity of the infection and the tremendous mortality in the early part of the epidemic. The other organisms seemed to play less important rôles in the production and virulence of the infection. In many instances the disease assumed an unusual severity from the beginning and pursued a rapid course, death occurring from an overwhelming toxemia within twenty-four hours after empyema developed.

The early clinical diagnosis of empyema is not always easy of accomplishment. In many of the rapidly fatal cases seen during the epidemic accurate ante-mortem diagnosis was impossible, the presence of purulent fluid in the pleural cavity being discovered only at autopsy. The fatalities in these cases occurred not from the empyema, *per se*, but from general bacteremia, autopsy in nearly every instance showing hemolytic streptococci in the blood and also in multiple abscess formations in remote portions of the body. Where the infection was less virulent and not so rapidly fatal, indicative clinical signs of empyema were usually noted, such as evidences of toxemia or the so-called "toxic shock," continued high temperature (102° to 104° F.), with chest pain, dyspnea and slight bulging of the affected side from pressure of the accumulated fluid; and if subjected to examination by means of the *x*-ray, as all these cases should be, the roentgenologist should be able to differentiate between empyema and pneumonia. The severity of the clinical manifestations, however, was not always in consonance with the virulence of the infection. In many of the early fatalities the patients exhibited slight symptoms until a few hours before death, when toxemia became pronounced as evidenced by profound shock, prostration, cyanosis and collapse.

Many early diagnostic clinical signs to be obtained by palpation, percussion and auscultation, have been mentioned by various writers, but for the most part they are unimportant in actual application, e. g., displaced cardiac impulse, tubular (rasping) breathing, dullness or flatness associated with abnormal breath sounds, asymmetric chest excursions, etc., etc. Roentgenological examination has proven of value in differential diagnosis between consolidation and pleural exudate; but thoracentesis and bacteriological examination of the fluid is necessary to determine the type of the infective organisms present. Blood pressure determinations are of little or no consequence. The leucocyte count, however, is always indicative as in all other suppurative processes. Exploratory thoracentesis still remains the only method by which the diagnosis can be certainly perfected and the stage of the disease determined. Several punctures may have to be made before pus is located, especially where the procedure has been delayed for a considerable time, as pleural adhesions are prone to occur thus creating pockets in which the fluid accumulates. "These pockets may occur in any portion of the pleural space, between the lung and the chest wall, or between the lobes." They may be single or multiple, in the latter case adding greatly to the difficulties of diagnosis and treatment.

The treatment of empyema is never medical but distinctly and essentially surgical so soon as the diagnosis has been perfected; and it is unfortunate that the surgical management of this affection seems impossible of even approximate standardization. In the army camps, as in civil practice, various methods were employed early in the epidemic, ranging from simple (repeated) thoracentesis to the radical procedure of costatectomy, with little variation in either morbidity or mortality. It was the custom of those in charge of certain base hospitals to practice early costatectomy, under the impression that radical measures were indicated so soon as pus had formed; thoracentesis frequently repeated was the sole procedure in other institutions; stab wounds and intermittent aspiration by means of catheters introduced through such wounds was also tried; drainage by Brewer's tubes was practiced, negative pressure being secured by siphon bottles; thoracotomy and irrigation with Dakin's solution was another procedure followed; also tried was the method devised by Mozingo and modified by Sherrill, which briefly consists of the introduction of a trocar through which a rubber tube is inserted into the pleural cavity and the fluid withdrawn by means of suction with a small

bulb syringe; the cavity is then irrigated every two hours with Dakin's solution, or until the exudate is dissolved as shown by the returned fluid; then the introduction of from 20 to 60 c.c. of two per cent. formalin in glycerine every two or three days after removal of the fluid until bacteriological examination is negative; the tube is then removed and the small opening covered with sterile gauze. A criticism of this method of treatment is that the tube is so small that it is impossible to keep the lumen open.

After the pneumonic process has become sufficiently clear and the type of bacteria has been determined, costatectomy having been decided upon, I believe the best method of procedure is to resect three-fourths of an inch of the rib (preferably the seventh in the post-axillary line) with rapid insertion of a rubber tube thirty inches long and one-half inch in diameter which is fastened into the cavity; sufficient pus is allowed to flow through the tube to insure its patency and a clamp then applied to prevent all the pus escaping during the operation; the patient is returned to bed with the clamp still on the tube, after which the clamp is removed and in the course of three or four hours the remainder of the pus is allowed to escape. The end of the tube is placed in a wide-mouth bottle half filled with normal saline of boric acid solution and the cavity is allowed to thoroughly drain. After twenty-four hours Dakin's solution or one-half of one per cent. chlorazine is introduced into the chest until the cavity is about three-fourths full, then a clamp is placed on the tube and the fluid held within the chest for fifteen mniutes after which the clamp is released and the cavity is allowed to empty itself. This procedure is repeated every two hours; a daily bacterial count is made from the last material draining from the cavity just before the Dakin's solution is introduced, this count being made at the same hour each day; when the bacterial count has diminished to only a few per field the tube may be detached from the chest wall and the cavity rapidly heals. The average time the tube remains in the chest is from seven to ten days. If these cavities are allowed to close too quickly, there will be a reformation of pus in the most dependent portion of the cavity and the surgeon will be forced, as I had to do on two or three occasions, to insert forceps through the resection opening and thus allow the accumulated pus to escape. These secondary pus formations are usually not very virulent in character and the wound quickly closes after having been kept open for a variable length of time.

The mortality in empyema cases during the height of the epidemic under the most approved methods of treatment was between forty and fifty per cent. This high percentage of mortality was not in my opinion due to the manner of treatment, but rather to a lack of perfect understanding of the nature of the disease. I believe, however, in the beginning of the epidemic some of the patients were operated upon too early, before the pneumonic process had sufficiently resolved to make the operation safe. Perhaps many of these patients would have died sooner than they did had they not been operated upon. In other words, some of these patients were doomed from the beginning because of the virulence of the infection, and they would have died just the same regardless of the method of treatment.

CONCLUSIONS.

(1) In the surgical treatment of empyema the best results are secured under local anesthesia, one-half of one per cent. procaine (novocaine) or one of the other preparations. The operation can be completed much more rapidly and with less pain to the patient, the average time being about ten minutes.

(2) In the case of delirious patients or those hyper-nervous, it was only necessary to administer a light general anesthetic (ether). It rarely required over 90 c.c., as little as 40 c.c. having been used.

(3) Observation has shown that a certain percentage of cases of empyema could be successfully treated by the injection of two per cent. formalin in glycerine, twenty-four hours old, from 10 to 40 c.c. being used every third day. This procedure was most successful in the type of fluid which contained only pneumococci.

(4) The operative results were better in those cases where the empyemic process had existed in the chest for several days, than where operation was performed earlier.

(5) The use of a medium or large moderately soft rubber tube thirty inches long and one-half inch in diameter fastened securely into the chest wound seemed to secure the best results so far as drainage was concerned, preventing soiling of the bed and lessening the bacteria in contact with the wound surface; this plan also entirely obviates the odor usually associated with the drainage in cases of empyema treated by other methods.

(6) Dakin's solution freshly made 49/100 of one per cent. may be used for flushing the chest every two hours after the first twenty-four hours, the fluid being held within the cavity by clamping

the tube for fifteen minutes each time. This plan has given fairly good results. Where Dakin's solution cannot be obtained one-half per cent. chlorazine solution used in the same manner gives practically the same results.

(7) The two one-gallon bottles with tube attachment and mouthpiece for each patient, one partly filled with water and the water blown by the patient from one bottle to the other, seems to be of great assistance in the more rapid inflation of the collapsed lung.

(8) The use of Dakin's or chlorazene solution as described, in my opinion helps to prevent the formation of pus-pockets within the cavity during convalescence.

(9) At the time of the operation, if the cavity contains a large amount of pus, it is advisable to prevent evacuation of the entire quantity at the time by plugging the wound, introducing a drainage tube with forceps attached and allowing gradual escape of the pus by loosening the forceps occasionally after the patient has been returned to bed.

TREATMENT OF TRAUMATIC SHOCK.*

A. H. HARRIMAN, M. D.
LACONIA, N. H.

In view of all that has been recently contributed to the treatment of traumatic shock, it becomes a vital question in the everyday work of the surgeon how much he must modify his usual methods in order to do for his patient all that will be demanded of him.

So very much literature has been introduced by men capable of making correct observation and drawing proper deductions from a large amount of material in the last few years, that it may well appear to the man who is somewhat removed from the world activities that the last word has properly been said upon shock.

But this is probably not true, nor can it be true of any condition that occupies, as this does, the borderline of life and death.

"Life is Act and not to Do is Death."

W. T. Porter from Harvard, and representing the Rockefeller Institute, in 1916 made extensive observations on shock in France. He has written a most readable little book entitled "Shock at the Front." When one also considers the very valuable material on shock from Cannon, Cowell, Fraser and Hooper of the British Medical Research Committee, together with a host of other comment and experiments, it becomes plain that one must exercise the best judgment he has if he attempts to discriminate.

Porter is a physiologist. He should be welcomed most cordially to our midst as a co-worker, for physiology is too often laid on a shelf as soon as the medical degree has been conferred. We can not all have his respiratory box, even if we desire it, and a tank of compressed carbon dioxide at hand, but we can if we choose, as Dr. Porter suggests, direct the patient, if sufficiently conscious, to breathe deeply. We can perform artificial respiration; we can assist the diaphragm in dragging from the abdomen the blood hypothetically collected there back to the heart by making interrupted pressure coincident with inspiration. In doing even this, we emulate, in a minor way to be sure, the example and teaching of a physiologist who devoted much time and energy to the betterment of surgery.

It calls for considerable material to carry out Porter's suggestions properly. In the first place, there must be a box and this attached to the face, or the neck of the patient, so that carbon dioxid gas can be let into the box and the gas breathed in a regulated amount. There are two holes in opposite sides of the box, one for the entrance of gas and the other for the entrance of air. There must also be a tank of compressed carbon dioxid to draw from in order to make the arrangement complete and these must have suitable tubular connections. The idea is that the splanchnic vessels are overfilled and that here is a reservoir into which the patient is bleeding. The box attachment is made to the head of the patient, carbon dioxid is supplied, and a sort of air hunger is produced which causes the patient to drag this load of blood by the force of deep excursions of the diaphragm back to the lungs, heart and arteries of the chest.

Cowell, of the French army, says that the best way to produce shock in animals is to expose the intestines and to handle them. The large veins of the mesentery become engorged, and the intestines have the appearance of being inflamed. But this does not occur in traumatic shock. Cowell also states that surgeons of extensive experience in the present war who have operated upon hundreds of patients in all degrees of shock testify that on opening the abdomen they have not found any primary splanchnic congestion. This is, of course, significant and decidedly casts doubt upon Porter's theory and advised practice.

Porter also makes other rather startling state-

*Prepared for reading at the 28th annual session, New York and New England Association of Railway Surgeons in New York Oct. 21, 1918, but which did not occur on account of the then prevailing epidemic of influenza.

ments. For instance, he says shock occurs only in about one in one hundred cases of casualties, and then only when there is a fracture of the femur or injury to superficial fatty parts. In these cases, he observed marked improvement where his box and carbonic gas was used. This may be so, but evidently Porter does not include the kind of shock that "lay" surgeons refer to as secondary shock, nor does he include the state of affairs occasionally observed during gall-bladder operations when the anesthetizer calls out that something is wrong at his end of the line. Porter sticks pretty closely to the idea that casualty shock is due to fat emboli, and offers as evidence that this shock comes on only a few hours after injury and that this observation is verified by the soldiers themselves. To further substantiate his views, Porter goes on to state that the head should be lowered and the abdomen raised so that the blood will be aided in returning to the chest—by force of gravitation, I suppose. Cowell observes that the condition of the injured is not improved by this procedure.

In point of time of occurrence, the shock described by Porter is simply that which has been observed for a long time and known as the "phenomena of fat embolism."

Shock is such a condition that it defines itself. It announces itself as an alarmingly precarious state of the circulation of the blood; and, as interpreted by some, the heart itself may be perfectly competent. In some way the blood has slipped away from the heart and does not return with its accustomed force and regularity. What would seem a practical question to ask is, where is the lost blood? If there has been a true hemorrhage, then there is an accounting. But where there is reason to believe that no hemorrhage has occurred, what is the explanation of what certainly appears to be a case of the blood of the entire system attempting to get into certain obscure channels and to remain there for an unusual length of time, or until the state which we call shock has passed away.

Now, in typical shock, the blood, and in its usual volume, is still in the body, still in the vessels, but not naturally distributed. The entire amount of blood of the otherwise normal person is still contained in its natural boundaries, *i. e.*, in the heart, arteries, capillaries and veins.

The surface of a person in shock is in the first place horribly blanched. The features are pinched, the lips cold and bloodless, the extremities are equally blanched, and the hands and fingers seem to be withered. There is a condition closely resembling the approach of death. In fact, it does often terminate in death. It is death struggling for mastery. The blood that has eluded the heart certainly is not in the capillaries superficially placed. This much is self-evident.

Now, how are we, as practical surgeons, to interpret this death scene? Of what use is it to argue that the blood is in a state of stasis in either the arteries, veins or capillaries alone, when in all reasonable probability, neither is or can be true? It seems to me, as only a lay surgeon, that we must look upon shock, as in truth it actually is, as a state near death or approaching death. Can anyone conceive of failure of the circulation wherein either the arteries, the veins, or the capillaries alone are affected? And knowing the vasomotor system as we all do, how can we escape the conviction that the heart equally in proportion to its importance as a circulatory organ is affected? The heart is still the emphatic and positive organ of the circulatory system. Now, looking at this matter in the light in which it occurs to me, with these facts plainly before one, with not many unproven theories to try to establish; and realizing the great importance of the heart as a circulatory organ, how can one escape the conviction that the heart in common with the vessels has most thoroughly participated in the blow that has prostrated the entire system of blood circulation?

Further, what obtains if we carry this state of approaching death to its termination in death? Men who have conducted autopsies ought to be able to answer this question, and I know they can do so. Let me ask, isn't the escaped blood always found engorging the large venous reservoirs of the chest? Certainly it is, or I have not seen aright. And why is it there? Simply because the heart, suffering under the staggering blow that shocked the entire vasomotor system had collapsed and could not carry on its work.

Autopsies on individuals who have been clubbed to death over the head abundantly prove this. These people die in a state of shock because the injury was so severe that the vaso-constrictors could not come to the rescue. In other words, the impulse to vaso-dilate, to prostrate, was powerful enough to overcome the impulse to vaso-constrict.

Isn't this about what one fairly well acquainted with the anatomy and physiology of the circulatory systems would anticipate? In shock the heart has been looked upon as a competent organ, and only passively failing in function, whereas the truth of the matter must be that it is in a state of absolute collapse and is unable to perform its accustomed

functions. The returning blood is in the chest, just where it would be supposed to be if the heart were for any cause disabled.

It will not be attempted to suggest that the heart collapse, or heart failure, is the sole cause of a perverted circulation, but I venture the assertion, (the heart being the emphatic organ of circulation upon whose functioning depends very much more than upon any other organ the normal continuation of the blood current), that the heart itself is the principal offending agency in the production of shock.

All natural processes are reasonable processes. Theories whose reasoning does not coincide with supposed natural laws usually have to suffer an early revision. I am not a laboratory man; far from it. Presumably that is true of much of my audience. To me, an individual in a normal state is dependent upon the continuous circulation of the fluid known as blood through a series of tubes the principal propelling organ being the heart. If by accident any of these tubes become severed and bleeding from the open ends is allowed to go on, a time comes when life is not only endangered, but that which we call life ceases entirely—the individual bleeds to death.

On the other hand, if no internal or external hemorrhage occurs and an injury is sustained that is so severe that the vasomotor system is placed in jeopardy and the whole circulatory system is, as we say in common parlance, out of commission, then that individual dies of shock of injury in some way transmitted to the heart as a principal agency and to all the bloodvessels as a lesser agency through the vasomotor nervous system.

Like all things else, this kind of reasoning must come to an end, but I want to refer again to the position of this excess blood at the autopsy. From the time of the injury until death ensued the individual was preparing, physically I mean, for death. Presumably the physical condition, so far as congested blood areas and prostrated heart action in two individuals suffering similar injury is nearly identical. But one dies and the other does not. The one that survived had a more or less gradual return of heart power and the other had a more or less gradual loss of heart power until death ensued. During the last few moments that this individual lived there could not have occurred any very marked change in the distribution of blood that had been welling up anywhere, so that at autopsy we would expect to find this blood at about the same locality where it was shortly before death; and there would not have been much difference between the over-full reservoirs of the one that lived and of the one that died at the particular time when both were living and just before the demise of one.

I confess I can see this in no other light and here and on these premises must I base my treatment. To my mind there is no question as to where this lost volume of blood will be found in the individual that dies. My word for it, you will find it in the large vessels of the chest, and in a very appropriate place, too. Shock is so near the substitute of death, why should we not be allowed to compare the two? Isn't the physical condition, so far as the lack of blood circulation is concerned, and the organs of circulation at an autopsy following death from shock very near what must be expected of that individual just before death?

The medical profession is rapidly coming to a very critical attitude. All things must be proven; and that is right. It may be said I cannot prove the entire premises in this assumption. The chest is, especially the center of the chest, rarely opened in life. Perhaps this of itself is suffiicent reason why the lost blood has not been located in the chest before now. With this I am willing to forego further discussion of this particular section.

Some one has offered the definition of Shock as "A sudden or instantaneous depression of organic, nervous, or vital power, often with more or less perturbation of body and mind, passing into reaction, or fatal sinking."

It seems to me that in considering the treatment of shock we might do well to keep in mind this old definition of shock, and of course I would distinctly keep in mind the premises heretofore outlined. I would not naturally recommend the use of carbonic oxid for respiration. I would prefer the free use of oxygen in its natural dilution. I would slightly raise the upper part of the body, because that is the easiest position for the heart belabored from most any cause. I would make the patient comfortable if I could by change of position, by surgical procedure, by medication, by supplied warmth, or by all these combined. Many of these details are carried out more easily than one can relate them. This is no time for fussing. Time is precious. The right thing done on time may mean life for the injured. Pain, fright, dread, are capable of producing, and once produced, of continuing shock. Handle the patient with the greatest care. Make him literally comfortable. Appeal to his courage and allay all mental perturbation possible. I know these seem so trivial that to some it may appear not worth the while. Perhaps not, but

these little side details can be introduced while we are performing more important duties.

Cannon, basing his conclusions on data furnished by Cowell, Fraser and Harper, in Report No. 2 of the Special Investigation Committee, Medical Research Committee in Great Britain, has written an interesting and practical paper upon the management of shock. He recites the history of cases with a diastolic pressure much lower than the critical level of Porter, as low even as 40 mm. with smooth recoveries. Porter calls 60 mm. the critical level.

In these cases cited by Cannon, usually a pint of bicarbonate of soda solution was given intravenously. In his recorded cases a hypertonic solution of 4% was given. One and five-tenths per cent. is isotonic with the blood plasma. Moreover, the bicarbonate solution should not be boiled as that process converts the bicarbonate into a carbonate, the blood probably being able to deal with whatever extraneous bacterial material there may be in a fresh unsterilized product.

Cannon in his exceedingly practical way states that "what is wanted is a fluid that will have the advantages already demonstrated from salt solutions—thinning of concentrated blood, lessening of viscosity and increase of blood flow with restoration of arterial pressure—together with antagonism of the state of acidosis."

Milroy is quoted to the effect that from recent experiments hemorrhage results in a loss of reserve alkali in the blood, also that Ringer's, or physiologic sodium chlorid solution, tends at times to aggravate this condition. There is evidence that a rapid state of acidosis is produced in cases operated upon in a state of shock.

After all hemorrhage has been stopped, the alkaline solution may be given. If it is not convenient to give it intravenously, it can be administered by rectum. For all practical purposes, it may as well be given by mouth or rectum, according to Bayliss.

The experiments conducted by Wiggers of Cornell confirm the already prevailing opinion that intestines escaping from the abdominal cavity should be protected by a media that is an imitation of the conditions that naturally surround the intestines, that is, they should be enveloped in gauze wrung out of warm normal saline solution. Wiggers says that abdominal shock is produced in animals by exposing the intestines and causing a current of warm moist air to blow on them; also, that coincident manipulations of the intestines while being exposed to the warm air current prevents shock or renders it less severe. These observations are of rather minor importance, and are not entirely in accord with other observations, but they show that there is no harm in a reasonable amount of handling of the intestines provided they are protected from the influence of the air. The natural sliding of intestines against each other is very similar to manipulation by gloved fingers. Presumably, no intestine has survived after a long exposure to air; no more do fish live out of water.

As to the fear of acidosis, it may perhaps be said that the subject has been too much stressed. It may after all be nature's method of conservation. Slight acidosis does no harm anyway.

It will be only a repetition of human events if in the present case in the treatment of shock some deductions and conclusions have to be dropped by the wayside and those who plod now will be compelled to yet plod on much as before.

Happily the results of many observers corroborate some of the findings of long ago, and this is consoling. Here are some with familiar faces: Stop any hemorrhage, clean immediately the point of entrance of injury if the surface is broken. Use iodine if you choose, but get it clean and apply a temporary sterile dressing. Get the head lower than the body. Get the patient warm and keep him warm. Avoid the possibility of chilling.

In my home town, one or two laymen employed about the traffic offices are instructed to do much of this if time allows before the surgeon appears. These first-aid assistants are also instructed to use the utmost degree of gentleness and care in removing an injured person. They are to straighten an injured limb, but not to reduce a compound fracture, and to apply anything to keep the limb in a normal or a comfortable position. These appliances are always to be outside of the clothing. The patient is then sent to a hospital on our own stretchers. At the hospital the patient is almost always immediately cared for surgically regardless of shock. If there is cerebral compression, shock lasts practically as long as life and compression together exist, and this calls for immediate attention and operation. If there is external hemorrhage, this must be attended to. If some hemorrhage has already occurred a saline solution is administered intravenously and operation is done under ether. If a limb is so far injured that conservation is entirely out of the question, amputation is done. If fractures occur, they are set under ether. If viscera are injured, every possible precaution is employed not to add to the shock already present that from operative manipulation. Intes-

tines are handled with care and not unnecessarily exposed. It is these injuries that produce the shock, and what better treatment of shock than to repair so far as possible the condition upon which the shock depends, and do it at once, too?

If pain exists, a dose of morphine is given hypodermatically, or by mouth. Ether is still a good heart stimulant. Great reliance must be placed upon the use of blood pressure instruments, before, during and after operation. It takes a short space of time to ascertain the blood pressure and it most certainly should be ascertained.

At the present time, the treatment of shock is passing through a transitional period. We may find out some time we are learning things that "ain't so." In the enthusiasm experienced while progress seemingly is making great strides, it is hard to believe there is "nothing new under the sun." There are new things probably cropping up every day, but the principle of the thing does not change. Remodeling and refinement of old principles is not exactly the making of revolutionary epochs. Billroth performed blood transfusion long ago, not with the precise technique of today, but the principle is the same and unchangeable.

That commodity known as common sense will yet be a serving and useful agency. Good ocular function is a prime requisite before placing anywhere near reliance upon any one agency to do what well applied soap and water can do. Cleanliness is the principle, both microscopic and macroscopic, for the former is very liable to be the child of the latter. The latter is very liable to be the common sense factor that so eloquently marshals the resources of the former.

To summarize: From a rather assiduous perusal of the foregoing experiments and their author's deductions, I do not see any very obvious reason to depart from the well-established principles of surgery already in use in the treatment of shock of injury. The success of surgery still depends upon the native ingenuity of the surgeon and he who lacks it will often have difficulty with "systems."

In treating this condition according to the premises of this paper, one will not transfuse blood, saline, or alkaline, solution, unless there has been a hemorrhage and that hemorrhage is stopped. In case hemorrhage has not been stopped, one would expect an increase of blood volume would increase the already existing hemorrhage. In case of no hemorrhage at all, transfusion is certainly wrong in principle, for it increases the volume of blood and as a consequence increases the work to be carried on by the heart that is already overburdened with shock.

A PLEA FOR A BROADER VIEW OF THE CESAREAN SECTION.

GEORGE S. FOSTER, M.D.,
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MANCHESTER, N. H.

Years of attention to operative technic and the passing of this potent influence from one generation to another with added emphasis has played a most important part in medicine.

Another important factor is the education of the public to rightly view and grasp the varied moves and ideas of surgery. Years ago, the public was very loath to accept any operative interference. Today, the public invites any standardized surgical procedure when definitely indicated. Why should this all be? It is because we are getting results. Asepsis, antisepsis, technic, team work, special adaptiveness and fitness and general public opinion favoring surgical principles, all have broadened, and today we face a condition of ideas so moulded as to have become established.

The same has held true relative to the Cesarean section. It is no longer considered a formidable procedure. This operation can be done as readily as any other accepted standard operation. The hazards have been lessened, and modern schooling has made this operation equal in safety to any abdominal operation, and far safer than some. Insofar as this part of the argument is concerned, we are free from the average danger and this special procedure is successful in that the mortality of today, in properly selected and prepared cases, is practically *nil* for both mother and child.

However, there is another factor which enters into the field of argument. This factor is the education of the public, and even of some of the physicians, to realize the simplicity of this operation. Too many of the public are willing to wait until the ancient and now obsolete indications for Cesarean section are written upon the countenance of the suffering mother in labor or soon to be in labor.

Each year hundreds of lives are sacrificed because of protracted labor, delayed labor, deformities of the mother remaining unrecognized until too late, the physical unfitness of the mother to endure the strain of delivery per vaginam, intercurrent diseases such as involvement of the kidney tissue or heart muscle, and other similar circumstances. Yes, hundreds of lives are sacrificed each year; and the loss is not entirely an infant mortality problem. It is true that the infant mortality in such circumstances is very high. Eighty per

cent of these deaths could be avoided by the Cesarean section done at the proper time. The maternal mortality due to childbirth could also be lowered even to a greater degree.

I was called to a distant city to see a young woman five months pregnant. Two years previous, she had been delivered of a child but only by the morcellation method. The physician stated to me that in nowise would he ever permit this patient to again go into labor. Physical examination revealed a perfectly normal woman, including all measurements. She was willing to go through any reasonable procedure. The formalities of the Cesarean section were outlined to her. She was a woman of high standing in her city, and as the family desired a child, she very readily grasped the situation, and when eight months and two weeks pregnant, Cesarean section was performed. A beautiful baby girl was delivered, and the mother made an uneventful recovery. Her happiness could not be expressed in words.

How many are the surgeons today who had rather remove a rather doubtfully pathological appendix, than to overlook or hesitate to remove the severely involved appendix, and thereby sacrifice a life? If ten patients, each with a questionably pathological appendix are operated upon and eight out of ten appendices show no abnormality, is it not better to remove all rather than overlook the two which would mean either death or a costly convalescence? All show like signs and symptoms. The scalpel is the only instrument that will bring to light the facts, and relieve the conditions. Perhaps one should be acute enough to tell the difference by physical examination, yet where is the surgeon who has that infallible knowledge? If you believe in strict conservatism, would you still be willing to be one of the ten and take the risk of a non-operative procedure at the expense of your health, happiness, responsibility toward your family, and liability of rupture, with its sequel, at any moment? I dare say you would not.

The Cesarean section holds the same place in modern surgery. In fact pregnancies in any standard family are much more numerous than diseased appendices. The fact is the profession owes the function of its science to every one in a doubtful as well as fully decided and clearly seen situation. Ten women who are pregnant for the first time, or who may have lost a child through an error in judgment during a previous labor, may be taken as examples. Each day places these women at a greater hazard as they near the term. Among these ten, perhaps there are four whose outcome and that of the child is in doubt. We admit that two of these four doubtful cases will go to term and deliver a viable child, after a more or less severe form of endurance. In the meantime, the remaining two go to term, and through some misfortune in action or judgment the lives of the little ones are sacrificed and possibly also that of the mothers. How much better it would have been to have performed Cesarean section on all four and thereby saved those who were otherwise lost! Who is there that can infallibly see the future in such cases?

The Cesarean section is a safe and sane procedure today. The previous risks of this as of many other operations have been eliminated. Under proper conditions, and in the cases that are supervised during the carrying period and the operation performed at the time of election, the mortality is no higher than in appendicitis.

One great factor in the Cesarean section is in the proper selection of the time when it is to be done. Of course, this must necessarily be supplemented by aseptic principles and proper technic. In other words, we can safely say today that the Cesarean section is one of the operations of surgical science which has become standardized and is no more dangerous than the average surgical operation. It is only a question of the proper operation properly done.

The Cesarean section should now have reached the stage when it is no longer an operation in emergency, a last resort. Place yourself in the position of the surgeon called in to perform the Cesarean section after hours of protraction, procrastination, digital interference, failure to apply forceps firmly and securely, and numerous other conditions, and you will appreciate the situation confronting you.

The Cesarean section is today an operation for early consideration in all cases of pregnancy where there is any, even a very slight, question of successful and clean aseptic delivery per vaginam. All other methods should not be tried first; under such circumstances the surgeon faces a contaminated field which it is next to impossible to cleanse. I have performed the Cesarean operation upon women who have given birth per vaginam, on multiple previous occasions. It was not done, however, until the woman had been in labor for many hours. No trouble was anticipated in these cases, yet it came. Inertia uteri is as real an indication for Cesarean section as a markedly deformed or contracted pelvis, providing that the muscular activity cannot again be revived. The point is this condition should be very early determined, and action taken immediately.

The old line rules of indications for the Cesarean section have gone by. Present days conditions have evolutionized obstetrics, and drawn it into the field of as truly aseptic and clean work as any in surgery. The obstetrician who fails to use most delicate aseptic technic, falls short of the mark and is seriously in error.

How many women are childless because of the dread of a long and painful labor? If this factor could be eliminated and more healthful children born each year, the stronger will be our nation a few decades hence.

In proclaiming this thought I am aware that I place myself on the defensive. However, I am willing, if by so doing, I can help to popularize this procedure—comparatively simple when properly done. It would save many babies annually.

This short argument would be incomplete without an enumeration of what I believe to be indications for the Cesarean section. The following enumeration is drawn up with the main ideas in mind: to broaden the scope of usefulness of this operation; to lower the infant mortality at birth; to elicit comment, criticism or commendation as the case may be, and thus alter the present basis of thought in connection with this operation.

INDICATIONS FOR THE CESAREAN SECTION.

1. Brow presentation where no progress has been made for six hours and version is contraindicated because of the physical condition of the mother.
2. In concealed hemorrhage.
3. In contracted pelvis.
4. In eclamptic coma.
5. In flat pelvis.
6. In labor complicated by small flat pelvis.
7. In well developed myoma complicating pregnancy.
8. In cases of extreme cervical rigidity.
9. Accidental hemorrhage.
10. Pernicious vomiting after the seventh month.
11. Marked chorea.
12. Advanced cardiac or pulmonary disease.
13. In cases of extreme muscular atrophy of the abdominal wall after a six-hour period has failed to advance the child.
14. Sudden death of the mother after the fifth month.
15. Any intercurrent disease after the sixth month where the continued viability of the child is a factor providing the life of the mother is not put at unwarranted hazard.
16. In cases of previous pregnancies where miscarriages have occurred after the sixth month; standard precautions being taken to extend the time of election to as near full term as reasonable.
17. In any case of questionable safe delivery of a viable child following a consultation of obstetricians and surgeons to at least the number of two each, and a majority favoring.
18. Protracted labor over a three-hour period and no progress even though cause be undetermined.
19. Delayed labor where months of pregnancy have been definitely determined.
20. Any physical unfitness of the mother to withstand labor after proper consultation has proven the fact. Medical, obstetrical and surgical men to the number of three to determine this fact and majority to rule.
21. Extreme kidney involvement, the time of election to be heeded.
22. Inertia uteri covering a three-hour period and other efforts failing to re-establish proper muscular activity.
23. In cases where women avoid pregnancy because of the dread of the pain of delivery, but would have a family if Cesarean section could be done at the time of election. This conclusion being drawn after proper free consultation and explanation to the family.

The above indications are drawn from a rather broad point of view. The main idea is to further the benefits of this operation always inviting a free consultation in each instance. Such a consultation should include the internist, obstetrician and surgeon and perfect collaboration with the laboratory. In each instance, the family should have the situation thoroughly outlined and its endorsement should be procured.

The main purpose of this paper is an effort towards saving some of the ten thousand children now annually lost during labor in this country, in order to enhance the personnel of our citizenship and strengthen our nation.

967 ELM ST.

URETERAL STONE AND STRICTURE.

From the history alone one cannot differentiate between utereral stricture and calculus. Given the typical history with which we have been taught to associate the diagnosis of ureteral stone, and without further data it is about as safe to make a diagnosis of stricture as of calculus, because stricture is by far the more common disease.—GUY L. HUNNER, in the *N. Y. State Journal of Medicine.*

A CASE OF CEDAR OIL POISONING IN A PREGNANT WOMAN.

Treated by Cesarean Section and Fisher's Solution. With an Experiment to Prove that Cedar Oil was the Cause of the Poisoning.

D. D. DeNeen, B.S., M.D.,
Cincinnati, O.

This case has not been reported earlier because of the author's engagement in the military service.

On March 13, 1917, I was called to Middletown, O., to see a pregnant woman, of 25 years, who had taken cedar oil the night before to produce an abortion. The patient is of the opinion that more than tablespoonful was ingested. Shortly after taking the oil she was seized with convulsions She was placed in the local hospital in the care of Drs. L. S. Grous and B. Sharkey.

Since my train was delayed, I did not see the patient until about 8 P. M., of March 13th. At that time she was in clonic convulsions, with her head thrown back. Her temperature was 104 F.; pulse, 120 and weak; urine loaded with albumin.

At consultation none of us was sure that the convulsions were due to the cedar oil. We were, however, agreed upon emptying the uterus by Cesarian section. Under chloroform anesthesia Cesarian section was performed and the patient relieved of a pregnancy which was about six months advanced. The incision was made through the upper part of the anterior surface of the uterus. The placenta was found in the incision. My hand was thrust through the placenta and the child delivered, then the placenta itself. The uterus was closed with three layers of continuous sutures.

Post-operative treatment consisted of Fisher's solution by Murphy drip. Before morning the temperature reached a point below 100° F. and the albumin was not so abundant. *There were no convulsions after the operation.* The patient returned to her home after about six weeks in the hospital, and is living at this time, which is two years and five months from the date of operation.

An experiment was performed upon a pregnant female bitch weighing 16½ lbs. On May 11, 1917. a tablespoonful of cedar oil (from the leaves) was given at 4:41 P. M. The dog fell to the floor immediately in convulsions, which were clonic in character. Its head was thrown back, and its breathing was stertorous. At 4:45 P. M. there was explosive vomiting of oil and food. At 4:47 P. M. blood was present in the saliva. At this time the dog was insensible to pain and to noise. At 4:52 P. M. the pupils were dilated and the conjunctiva injected. The abdominal muscles were involved in the convulsions, the eyelids were closely closed, and it was discovered that the extensor muscles were the only ones involved in the spasms. At the beginning of each convulsion the head was first drawn forward and then immediately thrown back. At 5:25 P. M. the dog became hypersensitive to noise. Thick mucus flowed from its mouth, respiration was labored between spasms and there was also batting of the eyelids between spasms. During spasms the respirations were jerky. Death occurred during the night.

An autopsy was held upon the dog May 12, 1917, and disclosed the following: Nephritis, small intestines contracted and inflamed, stomach ecchymotic; odor of cedar oil on opening the abdominal cavity; chicken clot in the heart due to slow circulation.

Since the symptoms were practically the same as those of the woman, the conclusion is that she suffered from cedar oil poisoning.

An Appeal for Embryological Material.

In 1906 I observed certain malformations of the human shoulder-blade, and in contributions to current literature I have given them the collective name—"the scaphoid type of scapula," and pointed out some of its hereditary, clinical and anatomical significance.

One of the most important fields of study of this condition lies in the intrauterine development of shoulder-blades. My investigations in this direction have been limited by the material at my disposal, which has been inadequate. I am, therefore, appealing to physicians for human fetuses in any and all stages of development.

It is desired that the material, as soon as possible after delivery, be immersed in 10% formalin in a sealed container, and be forwarded to my address; charges collect. Due acknowledgement will be made to those forwarding material.

Wm. W. Graves,
727 Metropolitan Bldg., St. Louis.

Suprapubic Bladder Puncture in Retention.

There is absolutely no danger in making a suprapubic puncture into the distended bladder, if done aseptically. It takes only a few seconds, gives immediate relief, and is much more desirable than tediously trying to force one's way by an obstruction, with all the dangers of false passage, traumatism, and hemorrhage. I am sure suprapubic puncture is far too little used in this class of cases.—V. T. La Rose in *The Journal-Lancet.*

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

15 East 26th St., New York, U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

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Original Articles and Clinical Reports are solicited for publication with the understanding that they are contributed exclusively for this journal.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, NOVEMBER, 1919

THE PRINTERS' STRIKE.

THE JOURNAL wishes to express to its subscribers and advertisers appreciation of their patient indulgence during the two months' delay in the appearance of the October issue which was incident to the settlement of controversies in the printing trade in New York City. This (November), the December and perhaps the January numbers will also be late in consequence. We hope, however, that thereafter the JOURNAL will reach its readers early each month, as heretofore.

PRIMARY TENDON SUTURE.

We would call attention to an employment of the Carrel-Dakin system that seems to us a logical adaptation beyond the original purpose for which it was devised. Ordinarily, in wounds of the forearm, hand, foot, dividing tendons and nerves, it is considered best to delay suture of these structures for a few weeks or until there is assurance that no organisms remain in the tissues—during which time tendons retract, their sheaths become distorted, and atrophy begins. It is, however, safe to perform suture of the divided structures at once, if a Carrel tube is so placed in the wound that the Dakin's solution, injected every two hours, bathes all portions. The skin, too, may then be closed, after excising its wound edges. After two or more days, when an aseptic course seems assured, the Carrel tube is withdrawn. In the hours that elapse between the injury and the operation, it is also advisable to thoroughly "dakinize" the wound, either with dichloramine-T in chlorcosane or with Dakin's hypochlorite solution by means of Carrel tubes.

CHARLES F. TAYLOR, M.D.

With the recent death of Charles Freemont Taylor there passed from American medical journalism an interesting and conspicuous figure. Coming to Philadelphia in 1883, he established there a new montly, *The Medical World,* devoted to the publication exclusively of brief practical articles, case reports and discussions, of interest in the every-day work of the general practitioner. *The Medical World* soon acquired, and has since maintained, one of the largest circulations among all the American medical journals. But Dr. Taylor was more than a physician and a medical editor; he was also a publicist, profoundly interested in government problems and in political reforms. He was an ardent advocate of the initiative, the referendum and the recall, and of some form of international government. In the nineties he undertook the editing and publishing of books by governmental experts, and established a quarterly magazine, *Equity,* devoted to political subjects. This magazine he conducted, at considerable financial loss to himself, until a few months ago, when it was merged into *The National Municipal Review.*

Believing that physicians should be good citizens as well as good doctors, Dr. Taylor established about 1894 an editorial department in *The Medical World,* which he called "Our Monthly Talk," in which he discussed municipal government and national policy. These editorials, cogent and based on broad reading, always bore the stamp of deep sincerity and faith in true democracy.

Later, he added another editorial department, "Business Talks to Doctors," in which he discussed the financial problems of medical practitioners—and no doubt saved many of them from the clutches of fake promoters.

Both of these departments Dr. Taylor continued personally to write—in spite of ill-health—until his death. The rest of the editorial work, however, had recently been in the hands of his associate, Dr. John Rommel, who will "carry on." The publication of *The Medical World* will be continued by Mr. Frank Taylor, its business manager for several years.

ANNOUNCEMENTS.

PROCTOLOGY ISSUE.

A valuable feature of the AMERICAN JOURNAL OF SURGERY has been the publication, from time to time, of special numbers, each devoted to a certain field of surgery and containing articles written for the purpose by acknowledged authorities in those fields. With our entrance into the World War we were constrained to discontinue this valued service because of the absence in the military service of so many American surgeons and of the similar absence of our editor-in-chief and our managing editor.

Now that the American medical profession has had opportunity to settle down again to the routine of civilian surgical pursuits and literary activities the JOURNAL will resume the publication of these special numbers, the subjects and contents of which will be announced. The February, 1920, issue will be a large number devoted to *The Surgery of the Rectum and Colon.* It is to contain the following contributions:

The Diagnosis of Ano-Rectal Diseases, by Alfred J. Zobel, San Francisco; Stricture of the Rectum, by J. Dawson Reeder, Baltimore; Cancer of the Rectum, by Jerome Lynch, New York; Aseptic Amputation of the Rectum, by Edwin Beer, New York; Proctitis, by Martin L. Bodkin, Brooklyn, New York; Perianal Infection, by David A. Kraker, Newark; Fissura Ani, by Lewis H. Adler, Jr., Philadelphia; The Medical and Surgical Treatment of Protozoan Infections, by John L. Jelks, Memphis; Rectal Abscesses, by T. C. Hill, Boston; The Roentgen Ray in the Diagnosis of Ileo-Cecal Valve Insufficiency, by Erwin Reissman, Newark; Notes on Surgery of the Rectum and Anus, by Walter M. Brickner, New York; and articles by Louis J. Hirschman, Detroit; G. Milton Linthicum, Baltimore; Charles J. Drueck, Chicago; and Samuel T. Earle, Baltimore.

SURGICAL SUGGESTIONS.

One of the most popular features, and certainly the most quoted, of the AMERICAN JOURNAL OF SURGERY was the editorial department of "Surgical Suggestions," discontinued a few years ago. Reprinted in book form, these Surgical Suggestions ran through several editions; a German translation was published in Leipzig in 1910; permission for a Russian translation was granted in 1914 but we presume that the outbreak of the war interfered with its appearance; recently we have been asked for permission to translate Surgical Suggestions into Spanish.

So many requests have been made for their resumption that we have decided to make these "therapeutic hints and diagnostic wrinkles" again a regular part of the JOURNAL.

RADIUM THERAPY.

In spite of much misgiving and many doubts it is now established beyond controversy that radium is an invaluable aid—in some diseases the only valuable aid—in certain affections of the human body, notably in Hodgkin's disease and lymphosarcoma, in leukemia, in some skin diseases, in "idiopathic" uterine bleeding, and in accessible malignant growths—especially carcinoma cervicis uteri and epitheliomata. For the development and establishment of these uses of radium we are chiefly indebted to that pioneer in and persistent proponent of radium therapy, Professor Howard A. Kelly, of Johns Hopkins University. The subject is so important in surgery, the indications for and technic of radium application are familiar to so few, that we have asked Prof. Kelly to give to our readers a practical résumé of "Radium Therapy." This article, illustrated with many convincing photographs, will appear in an early issue of the JOURNAL.

Surgical Sociology

Ira S. Wile, M.D., Department Editor

SAFETY IN BUILDING.

In the development of its work, the Federal Board for Vocational Education has been unusually active in presenting educational material designed to shed light upon various phases of vocational work. Its efforts have centered about the training of persons along various lines, together with making clear the opportunities presenting for securing the academic instruction and the practical experience necessary to make the individuals thoroughly self-supporting.

Bulletin 31 is devoted to A Study of Training Courses in Safety and Hygiene in the Building Trades. Its purpose is to give instruction to those working and to afford suggestions to teachers in vocational schools so that they may give the requisite instruction to students, with a more systematic and complete knowledge of the hazards of the industry than is generally to be found among such teachers.

Safety features in building construction are too frequently overlooked because of the temporary nature of the work and an insufficient realization

that accidents are as wont to occur in construction of a temporary nature as in well organized shops. Building regulations, possessing the nature of codes, usually relate to the types of construction, and deal largely with the safety of employees after the structure is completed. The obligation to protect employees during the course of erecting buildings is scarcely recognized, and the entire subject is more or less left to the contractors. The liability companies exert a powerful influence upon the contractors because they require that contractors live up to regulations of their making in order to minimize the danger of accidents with the consequent penalties. The inspectors of such casualty companies follow up the work and report unsatisfactory conditions which are thereupon corrected under the direction of those who have a financial interest in the safety of employees.

Accidents merit considereation not merely because of items of loss due to delay in building operation, lost wages, forfeits for failure to arrive at completion at the promised date, but because they possess a tremendous importance in view of the personal sufferings of employees, and the physical and mental injuries sustained by families forced into dependence or heavily charged with debt incident to the changes in family life resulting from the injury or death of the wage earner.

In the year 1916, the estimated number of industrial accidents in the United States was three million, or an average of ten thousand per day, with twenty thousand fatalities. "It is estimated that these accidents caused a time loss of 105,000,000 days, or 350,000 years of 300 working days each, and a loss of $210,000,000 in wages." It is not possible to rate the seriousness of accidents merely on the basis of time lost, because 90 per cent. of them will be found to cause a loss of time of from a few days to four weeks. All of these accidents, however, have serious possibilities if adequate attention is not given to the victim.

The severity of accidents is greatly intensified by virtue of infections. The injury, itself, too frequently is regarded with indifference, and precautions necessary for proper surgical treatment are not taken. The so-called minor injuries, because of their neglect, present the larger proportion of infections, and, in consequence, result in a prolongation of the disability, and, too frequently, an increase in their effect upon the potential working power of the individual who has sustained them.

Injuries of the hand are responsible for about 15 per cent. of all total disabilities. Approximately 65 per cent. of these manual disabilities result from injuries of a minor character that have become infected. It is patent that serious injuries of the hand are less likely to become infected because of the nature of the accident, which insures prompt attention at the hands of capable surgeons. In all probability, more time is lost and more suffering follows as a result of infection than from the original accident.

In one state, the average time loss of 8,877 infected injuries was 29 days while the average time loss for non-fatal injuries was 12 days. On this basis, the infection of the injuries referred to cost in claims $270,294 more than if no infection had occurred. This is merely representative of a wage loss incident to time of unemployment and fails to measure the decreased earning capacity that frequently followed the infection of what was originally a simple injury, the healing of which might have been uneventful had the proper emergent surgical care been given.

The possibility of reducing accidents has been recognized and conscientious contractors spare no efforts to bring about the reduction of injuries through the institution of safety devices of various kinds. As an illustration of the possibilities, the experience of a single contractor of Springfield, Massachusetts, may be cited. During 1919, the number of accidents per thousand employees was 399; in 1916, 303; and in 1917, 180. Within two years there was a 55 per cent. reduction of accidents, and a 66 per cent. reduction of accident costs.

The necessity for stimulating interest in safety regulations and precautions requires emphasis at this time when there are many evidences of an increased construction requiring the employment of large numbers of men in the building trades. The national campaigns for thrift should, above all, stress the importance of saving manpower and of increasing, or at least, not diminishing the industrial capability of workers. The school systems, themselves, have a tremendous responsibility for teaching the young to realize the value of safeguards of various types and the importance of observing of safety precautions so that a habit of safety will be inculcated. In the building trades, particularly, the item of self-interest is closely bound up in a feeling of responsibility for the welfare and safety of co-workers. The hazards of the trade are not essentially inherent, and most of them may be easily obviated by attention to details and a recognition of the fact that speed in building is not of greater value than safety. Whether buildings be demolished or constructed, whether the

work be excavation, blasting, hoisting, the storing of material, the building of scaffoldings, or the manipulation of machinery involved in building operations, there are proper methods of procedure which must needs be followed to avoid injuries to workers, passers-by, or, indeed, those living in the vicinity of the building operation.

The element of chance does not enter into the architect's design, nor in the plans for securing the essential materials for building construction. Nor should it be permitted to exist at any stage of the building operation.

Safety and hygiene are as necessary in building for safeguarding the builders as is provision of safe materials for the success of the building.

Progress in Surgery

A Résumé of Recent Literature.

A Contribution to the Study of Stiff and Painful Shoulder. ALFRED J. BROWN, Omaha. *Surgery, Gynecology and Obstetrics,* October, 1919.

Brown refers to the studies by Brickner, Codman and others, of shoulder disabilities, and adds to the causes of "stiff and painful shoulder" described by these authors, tear of the tendons of the latissimus dorsi and teres major near their insertions.

These cases resemble closely cases of subdeltoid bursitis. They present a point of marked tenderness on the inner surface of the humerus high up in the axilla and in cases of moderate standing an atrophy of the deltoid from involvement of the circumflex fibers.

One is struck by the remarkable similarity of the trauma in many cases. The patient states that he grasped a flying ring in a gymnasium or was hanging to a strap in a car and the car gave a sudden lurch, or he felt he was about to fall and threw down his arm to save himself, or was pitching a baseball and felt something give in his shoulder. In all cases the predominant factor is a sudden sharp adduction of the humerus either in the form of a reflex contraction stopping unexpected abduction of a suddenly applied muscular overstrain as in pitching. In all these motions the muscles thrown into sudden action are the teres major and latissimus dorsi which contract with great violence in order to prevent the sudden and unexpected abduction. Depending upon the time since the injury the condition appears as acute, subacute or chronic.

The three significant signs which point to a disability due to a tear of the fibers of the teres major and latissimus dorsi tendons, other conditions being ruled out by careful examination, are:

1. Pain when the involved muscles are placed on the stretch by the motion of abduction and external rotation in the abducted position.
2. A definite point of tenderness in the tendons of the muscles at or near their attachment to the bone, i.e., high up in the axilla.
3. In the subacute or chronic cases atrophy of the deltoid muscle greater than that from disuse occurring without demonstrable gross nerve lesion.

In the acute stage the treatment consists in immobilization for a short time; active motion begun early for short periods and always within the limits of pain; prevention of new insults to injured or reparative structures by splinting the deltoid and inhibiting motion tending to cause such insult; and local and general massage intelligently employed.

In the subacute stage the patient is encouraged to use the shoulder, but always within the limits of pain. Examination will discover movements which can be performed without pain. These should be pointed out to the patient and he should be encouraged to practice them. Massage should be used and may be more vigorously applied as the object in this stage is to promote a new blood supply in scar tissue which is at least partly formed.

In the chronic and more severe cases it is necessary first to break up the firm scar and fibrous tissue which has formed in the tendons and the adhesions which have formed in the surrounding axillary tissues; also to overcome the shortening of the muscles which has taken place as the result of carrying the arm in the sling position for a considerable length of time. This is best accomplished under an anesthetic. This transforms the condition to one comparable to a case in the acute stage and it should be treated accordingly.

Infected Wounds of the Ankle. P. CHUTRO, Paris. *The Journal of Orthopedic Surgery,* September, 1919. .. ..

Authorities seem to be agreed that whenever the ankle joint is infected and the astragalus fractured, that astragalectomy is indicated. However, even with astragalectomy, unpleasant sequelae follow so often that amputation is not unusual.

Chutro believes that the symptoms are due to the fact that with the foot mobilized at right angles, by apparatus which is not well adapted to the front of the leg, or back of the ankle, the mortise coming into contact with the superior surface of the os calcis. The consequences of this forward dislocation of the foot are:

(1) A disappearance of the retro-malleolar spaces is brought about, the tendon of Achilles, coming closer to the bones of the leg.

(2) The border of the mortise, displaced backward, causes traction upon the flexor of the great toe, and then upon the common flexor of the toes, giving rise to a flexor contraction of the toes, and a plantar flexion of the fore part of the foot. The day that the patient abandons his apparatus, this same contraction of the foot will conduce markedly to the equinus deformity.

(3) The same tension produced by the mortise on the tendons also act on the posterior vasculo-nervous bundles. The circulatory embarrassment is aggravated by the compression of the vessels, due to the disappearance of the retro-malleolar spaces. The return circulation suffers especially, and the foot presents the signs of a permanent, passive hyperemia with cyanosis, sweating, and variations in the local temperature.

(4) The change in the position of the foot, and especially the change in point of contact of the mortise, results in the os calcis, whose anterior part is normally elevated from 11-19 degrees, becoming completely horizontal, even coming in certain cases to present its posterior portion higher than its anterior apophysis. These complications are avoided by Chutro's method of treatment, which is described in his own words, as follows:

In addition to cleaning the wounds of entrance and exit, we perform an incision in the form of an italic "S", commencing above the external malleolus and descending along the anterior aspect of the malleolus to the line of the ankle joint, becoming then almost transverse as far as the prominence of the tendon of the tibialis anticus, then becoming again longitudinal and descending 2 or 3 centimetres. An astragalectomy is done, and when the cleaning of the wound has been done, the foot is fixed in good position.

In order to fix the foot, one passes a bronze wire through the skin and soft parts of the inferior lip of the wound: this wire grazed the posterior superior border of the cuboid, and then following a recurrent path, it traverses the anterior border of the external malleolus and the soft parts of the other lip of the wound. The necessary drainage tubes were placed, and the wire twisted. This partial closure of the wound never presented any ill consequences, because there remained always a large opening, well exposed, which permitted the discharge of pus and liquids.

When the infection had spread to the sheaths of the

postero-internal tendons, one added a debridement which extended to the point.

The advantages of this fixation by bronze wire are the following:

(1) The cuboid is brought close to the external malleolus.

(2) The tarsus is projected backward.

(3) The anterior portion of the os calcis retains its normal elevation above the horizontal plane, and flat foot is avoided.

(4) The retromalleolar spaces become deeper than normal.

(5) There is no traction on the posterior tendons, nor compression of the vessels.

(6) The Achilles tendon is not shortened, and there is in consequence less probability of equinus deformity.

(7) The mortise, which is concave, rests above the articular surface of the os calcis, which is also concave: there remains, between the two, a cavity which will later be filled with a fibrous tissue, which will prevent bony anchylosis and will permit a certain mobility of the foot.

(8) The anterior tendons having their points of insertion nearer each other will gain in force and will contribute to the prevention of equinus.

The operation finished, the foot is immobilised at a right angle by a figure-of-eight bandage, extending from the heads of the metatarsals to the inferior ¼ of the leg.

The dressings were renewed at very long intervals, every 15 or 20 days. The bronze wire was removed about the fifth week. The patient commenced to walk on his foot between the fourth and fifth week, without crutch or cane; during the first days he was permitted to lean upon a chair or upon a comrade, but at the end of some days he walked alone.

On Focal Infections As a Cause of Painful Heel. SIGMUND EPSTEIN, New York. *Medical Record,* August 2, 1919.

Epstein presents three cases of painful heel, due to three different types of infection, tonsilar, dental and gonorrheal. Each of these was cured by removal of the focal infection. In reference to dental foci, the author presents the following opinions:

1. The results of extraction of teeth are more brilliant than those of root-amputation.
2. Often the beneficial results of removal of septic bridges, and of forgotten or buried septic roots can be felt within a day after the eradication.
3. Do not expect this to happen where there have been marked bony changes around the margins of joints, such as the *x*-ray shows in the form of osteophytes of greater or lesser size.
4. The results of extraction of septic dental foci are more favorable in younger patients, especially where the symptoms are polyarticular or muscular.

The Fate of the Bone Graft. A Clinical Study. WILLIS CAMPBELL. Memphis. *Southern Medical Journal,* September, 1919.

Campbell uses 75 cases as a basis for his discussion. He used only autogenous bone grafts. Most grafts were made with the motor saw from the shaft of the tibia. The conditions for which grafts were performed were the following:

1. Deficiencies in the body of the vertebra: tuberculosis, fractures, congenital anomalies, spondylitis deformans. The Albee operation is required, which consists in splitting the spinous processes of at least seven vertebrae, making a gutter or trough in the midline, into which a graft of equal length is inserted from the tibia. The object is fixation, prevention of deformity and indirectly affecting the diseased process.
2. Congenital deficiencies: congenital absence of whole or of parts of bones.
3. Acquired deficiencies: trauma, infection, tumor, etc.
4. Ununited fractures.
5. Fixation of joints when motion is undesirable, as in paralysis, and to produce ankylosis in diseased joints in tuberculosis, arthritis deformans, and extreme trauma.

From a close analysis of these cases he presents the following conclusions:

1. In adolescents and young adults, grafts are more vigorous and apparently act as a living, integral part, showing no disintegration, but a gradual increase in size and thickness.
2. Every evidence indicates the inlay as the physiological method. The intramedullary graft should not be employed where osteogenesis is feeble.
3. Spinal grafts in young children, and probably in adults, are absorbed.
4. The graft may be inert or very feebly osteogenetic but mechanically perform the function for which it was employed,—as in the neck of the femur (dense into spongy bone).
5. From the *x*-ray pictures in a few cases bone appears to form in strata about the original graft very much as an involucrum about a sequestrum, though no definite evidence of such action has been produced.
6. Further study of a larger number of cases over a longer period of time is necessary before definite statements can be made.

Primary Suture of Gunshot Wounds. With some remarks Upon the Application of Similar Principles in Civil Surgery. SUMNER L. KOCH, Chicago. *Surgery, Gynecology and Obstetrics,* October, 1919.

Of the surgical advances which the experiences of the war have brought, one of the most important, from the standpoint of the civil surgeon, is the knowledge that, under appropriate conditions, recent infected wounds may be excised, surgically cleansed, and sutured, with the confident expectation of primary healing in 85 to 90 per cent of cases.

In the lacerated and contused wounds of emergency and industrial surgery, as in comminuting gun shot wounds, the chief difficulty, aside from anatomical considerations, lies in determining the extent of injury, and in removing all the damaged structures and tissues whose blood supply has been destroyed. With crushing wounds, the surgeon will remember that the degree of injury is usually more extensive than may appear in the first few hours. The result of trauma to the blood supply appears gradually through 24 to 48 hours, so that tissues which appear fairly normal at operation may show definite evidences of gangrene 24 hours later.

Adequate incisions, with an exposure of the injured parts that will permit the operator to see clearly into every corner of the wound, are absolutely essential to success. If the damaged tissues are completely excised an eight-inch incision will heal as rapidly as one of four inches. The use of a staining solution such as methylene blue or brilliant green, as advised by LeGrand, Wilson Hey and others, may be of help in recognizing recesses of the wound that might otherwise escape attention. Complete control of hæmorrhage and obliteration of all dead spaces without undue tension have been frequently shown to be of primary importance. Dispensing with the constrictor at the earliest possible moment will aid the operator in determining whether the tissues left behind have an adequate blood supply. The contraction of the stimulated muscles when the paralyzing effect of the constrictor has been removed will also help to show the vitality of the tissues.

In cases of doubt, the procedure of loosely packing the wound after excison with gauze saturated with 1:1000 flavine solution, or with liquid paraffine, and waiting for 48 to 72 hours before completing suture, seems to be of distinct value.

Koch reports several interesting cases, with the following statistical summary:

Of 116 flesh wounds treated by primary excision and suture at a base hospital on an average of 49.81 hours after injury, 99 (85.3 per cent) were completely successful; 11 (9.5 per cent) were partially successful; 6 (5.2 per cent) were complete failures. Of the failures 5 were due to infection with hemolytic streptococci.

Of 45 wounds complicated by a wide variety of bone,

joint, nerve or tendon injuries, operated upon after a similar interval of time, 26 (57.7 per cent) were completely successful; 17 (37.7 per cent) were partially successful; 2 (5 per cent) were failures.

Of the total, 77.6 per cent were completely successful; 17.4 per cent were partially successful; 5 per cent were failures.

Of 37 wounds excised at the front on an average of 16.3 hours after injury, and sutured at the base 62.6 hours later, 31 (83.8 per cent) were completely successful; 3 (8.1 per cent) were partially successful; 3 (8.1 per cent) were failures. The successful cases included 9 complicated by bone or tendon injury.

The Treatment of War Wounds of the Joints. PIERRE DUVAL, Paris. *Surgery, Gynecology and Obstetrics,* September, 1919.

Duval traces the remarkable improvement in the treatment of joint wounds, from the early days of the war to the years, 1917 and 1918. He describes the revolution which has taken place from the early days of wide arthrotomy and drainage, with its terrifying and disastrous results, both as to life and function, to the later days of excision and immediate suture, with wonderful improvements as regards conservation of both life and function.

The pathological basis for immediate closure of joints is found in the fact that the synovial membrane is very resistant to microbic infection, as well as the synovial fluid, and that these structures remain sterile for 36-48 hours after the surrounding tissues are actively infectious. Early operation and suture of the synovia therefore has a definite scientific basis, aside fom the fact that results obtained by this method are so remarkable.

Total immediate suture of wounds of the joints, preserving the maximum amount of bone surface, was finally adopted generally, in 1917, after a period of hesitation, after the more apparently conservative methods had all been found wanting.

The principles generally recognized now in war wounds of the joints are:

1. Operation as early as possible.
2. Complete operation, that is removal of all foreign substances; total excision of the tract of the missile.
3. Careful cleaning of the fractured surface, complete suture of the joint without drainage.
4. Active and immediate mobilization.
5. Preservation of parts to as great an extent as possible, immediate resection being limited to injuries with extensive communication.

The technic varies with the case. There are two general methods: (1) treating the peri-articular wounds first, gradually proceeding to the joint; (2) treating the joint injury first and the peri-articular wounds, after. Duval pefers to do the arthrotomy first, cleans the joint, treats the fractured bone surfaces, resects the damaged synovial membrane, and closes the joint before proceeding to the treatment of the wounds of the soft parts. But the reverse order has yielded splendid results also.

The arthrotomy incision should be ample,—in the elbows, either internal lateral, external lateral or midline posterior incision. For clear exposure it may be necessary to divide the external lateral ligament. In the knee-joint, either the U-incision with section of the patellar ligament or unilateral or bilateral incisions may be used, according to the indications in the case.

The treatment of the bone injury is of utmost importance. In limited injuries the bone is simply superficially cleansed, particularly if the operation is done within 8-12 hours after the injury. When possible, bone cavities chould be left extra-articular, which can be done if the synovia is properly sutured. If necessary, they may be left opening into the joint, or filled with wax, or free muscles flaps. Tissues should be scraped clean; displaced bone fragments should be replaced; occasionally nails, screws, or wires may have to be used to maintain apposition.

Serous fluid should be completely dried out. Antiseptics, even ether, should not be rubbed over the surfaces. Final suture should be in layers preserving anatomical lines as far as possible. No drainage should be used. Important tendons, like the triceps or quadriceps should be sutured at the same time, if torn. Active immediate mobilization of the joints as advocated by Willems, is the method of choice in post-operative treatment.

The above method of surgery can be applied up to 24 or 36 hours after the injury. When purulent arthritis has developed, early resection of the joint gives best results.

The author presents photographs and statistics showing the decided improvement in results since the early days of the war.

Treatment of Infected Bone Wounds. FREDERIC J. COTTON, Boston. *The Boston Medical and Surgical Journal,* September 25, 1919.

Cotton presents a series of cases of bone infections studied at U. S. A. General Hospital No. 10, from which he draws a very hopeful outlook for the ultimate cure of all such cases in the future. The essential factor in the treatment is "antisepsis," preferably by means of the Carrel-Dakin technique. There were 346 cases admitted, with 182 operations. There were only two amputations, one for a hopeless crushing of the knee, the other for a limb rendered worthless by paralysis. There were no cases of secondary osteomylitis after cleaning operations. The operations consisted, as a rule, ot removal of sequestra, and opening of the wound so as to permit thorough irrigation with Dakin's solution. Occasionally large bone cavities were sterilized with 95 per cent carbolic acid and filled with bone wax. The results in these cases were also good. Or wax may be used after sterilization by the Carrel-Dakin method.

Infections of Wounds of War, with Special Reference to Gas Gangrene. ROSWELL T. PETTIT, Ottawa, Ill. *Journal of the American Medical Association,* August 16, 1919.

Pettit gives a review of the infected wounds of war assigned to Evacuation Hospital No. 8, during the St. Mihiel and Argonne-Meuse operations. An effort was made to obtain clinical information as to the time between injury and operation, effects of exposure and cold, of shock and hemorrhage, character of wounds, effects on local circulation, nature of the soil of battlefields and the influence of operative interference. Special effort was also made to secure the more important anaerobes and the hemolytic and nonhemolytic streptococci in cases in which gangrene developed. During October, it frequently happened that over 200 patients were operated on under general anesthesia within twenty-four hours, and between Sept. 10 and Nov. 13, 1918, 4,471 patients were admitted to the hospital. Nearly all of these received wounds in action, of which 2,993 were single and 1,387 multiple. The distribution of the wounds is shown in a table. In 206 cases, amputation was necessary, and during the period named there were 363 deaths in the hospital, gas gangrene being the most important cause (in 5 per cent. of the total wounded). This hospital received only the more seriously wounded, which accounts, in part, for the high incidence. Experience indicated that early surgical interference is one of the most important factors in the avoidance of gas gangrene. It occurred most frequently in the heavily muscled part of the body, the highest incidence being seen in the wounds of the shoulder and the leg, and in the arm, buttocks and thigh, in the order named. As transportable patients were quickly evacuated, bacteriologic examinations were limited to those that could not be removed. The methods used are described. Of 890 wounds examined bacteriologically, 478 (53 per cent.) were found to contain anaerobic bacilli, and 321 of these 478 (67 per cent.) at no time showed evidence of gas infection. Thus, in the experience of Pettit, more than two-thirds of the wounds anaerobically contaminated did not develop gangrene during an observation of at least five days, and often more than two weeks. In 139 cases in which cultures were taken directly from the wound, *Bacillus welchii* was found with other anaerobes in 65 per cent. Chain-forming cocci were found in 219 wounds examined, one-third of them hemolytic, and the results show that the streptococcus was no more frequent in gangrenous than in non-gangrenous wounds.

The Futility of Bridging Nerve Defects by Means of Nerve Flaps. BYRON STOOKEY, Major, M.C., U.S.A. *Surgery, Gynecology and Obstetrics,* September, 1919.

Stookey reviews the statistics of nerve-flap operations, and presents 23 cases, bridged by various sorts of flaps. He is convinced that the fundamental principle of the operation is wrong, and the clinical results disappointing. His own summary of the work is as follows:

1. The repair of nerve defects by means of nerve flaps has not been definitely supported clinically, as evidenced by a clinical study of reported cases.
2. Experimentally, it has been shown, that nerve flaps do not act as conducting paths for the down growing neuraxones.
3. Nerve flaps, whether central or peripheral, are merely degenerated partial nerve segments. Continuity and union of neuraxones does not take place at the point of suture.
4. To avoid fallacious deductions it is important to distinguish between the level of the injury to the nerve trunk, and the level at which muscular branches arise.
5. Abnormal communicating branches are not rare, particularly between the median and ulnar. Such anomalies must be taken into consideration in any careful study of nerve injuries.
6. Judging from the level of the lesion, muscles may not be presumed paralyzed, but must be demonstrated paralyzed.
7. Total movements may not be offered as evidence of the return of function. The action of individual muscles must be given.
8. Reports of peripheral nerve injuries, to be of value, must be accompanied by motor, sensory and electrical findings.
9. By the formation of nerve flaps from the central stump a portion of the nerve from which neuraxones must grow is removed. Distal as well as central flaps may destroy muscular branches. By reversing the flaps they are taken out of their field. Thus the down growing neuraxones are prevented from reaching the muscles through these muscular branches, even were regeneration to take place.
10. The nerve-flap method to bridge nerve defects should be discarded in peripheral nerve surgery.

A New Sign of Nerve Regeneration. ISADOR H. CORIAT, Boston. *Boston Medical and Surgical Journal,* August 7, 1919.

Coriat discusses the new and important sign discovered by Tinel, the so-called "signe de fourmillement," the appearance of formication or tingling produced by pressure. This test when taken in conjunction with the return of electro-conductivity and selective sensory regeneration forms a triad of signs of regeneration of nerve, which is very important in order to determine whether spontaneous nerve repair is going on or whether sutures should be performed.

The test is accurately described in Tinel's "Nerve Wounds." When compression or percussion is lightly applied to the injured nerve trunk, we often find in the cutaneous region of the nerve a creeping sensation, usually compared by the patient to that caused by electricity. It appears about four to six weeks after the injury, and must be distinguished from pressure pain which occurs at the site of the injury, and not in the area of cutaneous distribution. As nerve regeneration progresses the sign is elicitated further down along the course of the nerve. If the point of pressure remains stationary for a length of time we are warranted in concluding that regeneration has stopped.

The test is very easily applied, but should be carefully done in each case, as the tingling produced by neuroma formation may lead to error. In neuroma formation or in the early stages of regeneration without neuoma formation, the formication is limited to the level of the lesion. In the neuroma formation also, where the regenerating axis-cylinders are blocked and may consequently lose themselves in the surrounding tissues, the formication remains fixed at the level of the lesion. In actual regeneration of the nerve the formication progresses over the zone of the growth of the axis-cylinders and can finally be detected along the partial or entire cutaneous distribution of the nerve. For a time it may involve the entire cutaneous distribution, but as regeneration becomes complete, it finally can be detected only in the extreme periphery.

The exact cause of this formication it is difficult to state, but since it can be produced by a far lighter pressure than formication in an uninjured nerve, it probably is due to an increased sensitiveness of the young axis-cylinders. It is best, however, not to rely upon the formication sign alone. The test should be carefully correlated with the other investigations of the nerve lesion, such as protopathic and epicritic sensibility, regenerating pain points, and electrical reactions.

Traumatic Head Surgery. CHARLES W. ROBERTS, Atlanta. *Southern Medical Journal,* September, 1919.

1. Lacerations of the soft parts should not be looked upon as simple conditions. The frequency of brain abscess following such injuries does not justify this viewpoint.
2. All depressed fracture cases should be operated upon. Late epilepsy, or interference with the highly organized cortical centers, demands this method of treatment.
3. The important factor in a head injury case is not the presence or absence of fracture of the vault or base. Patients most seriously injured commonly have no fracture at all, and, conversely, the simpler types of brain injuries are frequently associated with tremendous linear or depressed fractures. Often these apparently alarming fracture cases are saved by the very enormity or extent of the rent in the bone, permitting quick drainage of free blood and the fluids resulting from rapidly ensuing edema.
4. The study of a head injury patient, and the method of treatment required, hinges upon the question of intracranial pressure. The elevation of depressed bone, the removal of loose bone fragments, the checking of hemorrhages and the repair of soft parts are the simple incidents connected with a given case. A gradually increasing intracranial pressure, as evidenced by a rising pulse pressure but more accurately by frequent resort to the ophthalmoscope and the spinal mercurial manometer, should be convincing proof that a cranial decompression and drainage should be performed.
5. The decompressive effect of a craniectomy is dependent upon the area of bone removed and fails to be of value unless the dura is widely opened and left open. The old-fashioned trephine should be discarded and remembered only as of historical interest.
6. The diagnosis of "concussion of the brain" should be held in reserve for that class of cases suffering only temporary symptoms. The lack of a proper understanding of the significance of this term negatives scientific investigation and the effective handling of many cases.

Intraocular War Injuries. R. D. SLEIGHT and WILFRED HAUGHEY, Battle Creek. *Journal of the Michigan State Medical Society,* September, 1919.

The authors discuss and comment upon the six laws of La Grange, adding a seventh of their own.

First Law.—Injuries to the inner coats of the eye may be caused through commotion of the air from the explosion of a shell at some distance. There are also well authenticated cases of luxation and subluxation of the lens, and of traumatic cataract, caused in this way. The fundus lesion usually seen is a rupture of the choroid or retina or both at the posterior pole.

Second Law.—Injury to the orbit by traumatisms of the frontal region and radiating fracture of the orbital vault, usually involve the optic foramen or sphenoidal fissure and cause lesions of the sensory, motor, and optic nerves, the eyeball itself being uninjured.

Third Law.—Injury to the facial bony structures, but not involving the orbit, produces lesion of the eye, by concussion, at the macular region. This was found to be the commonest cause of impairment or loss of central vision, but the type of fundus lesion is not constant.

Fourth Law.—Injury to the facial bony structures producing fracture of the orbit, with more or less depression of its walls, without striking the eyeball, produces two

types of fundus lesion: macular and paramacular changes by concussion, and peripheral fundus lesions at site nearest the injury to the orbital wall.

Acute Mastoiditis. THOMAS J. HARRIS, New York. *The Laryngoscope,* September, 1919.

Harris confines his remarks to cases of acute mastoiditis that complicated measles and influenza at General Hospital 14, Fort Oglethorpe, Ga.

Of 1,687 ear cases treated 607 were cases of measles. The striking clinical feature of these cases was absence of pain in the ear. If free drainage was not established early acute mastoiditis appeared, as a rule without pain. The reason for this absence of pain is not apparent. A thick outer cortex and general stupor were doubtless factors. With early operation recovery was slow but uneventful. Nitrous oxide and oxygen proved a very satisfactory anesthesia.

Otitis media is not a frequent complication of influenza. Of 7,000 cases only 120 instances of acute middle ear suppuration occurred. All patients had fever, some had pain. The appearance of the drum membrane was characteristic, the distinctive features being the bleb formation. There was no uniformity in the nature of the organism.

The slow healing of the operated cases may be accounted for by the poor general condition of the patients.

Acute Otitis Media Purulenta and Acute Mastoiditis at the Base Hospital, Camp Stuart, Va. JOSEPH D. KELLY, New York. *Medical Record,* September 6, 1919.

Kelly presents the statistics and conclusion drawn from 200 cases of purulent otitis media and 48 cases of mastoiditis. He describes the technique used in the treatment and scientific study of these cases. The following inferences seem to be warranted.

1. It is very difficult to obtain a pure culture or to know the inciting organisms in acute purulent otitis media.
2. Mixed cultures will invariably be present after 24 hours of discharge.
3. The presence in a discharge of virulent pyogenic organisms does not necessarily mean that mastoid involvement will follow.
4. The individual anatomical characteristics of the mastoid may not be a deciding factor in the development of mastoiditis.

Recurrences after Operations for Empyema. FRANKLIN A. STEVENS, Boston. *Journal of the American Medical Association,* September 13, 1919.

Final results of operations for empyema can be ascertained only after a considerable period, varying in length according to the infection, the size and the shape of the cavity, and the treatment followed. The minimum of recurrences occurs when the sinus has been completely obliterated after treatment, and they are more frequent when a cavity containing air is left. If the Carrel-Dakin treatment is used to sterilize the cavity, the chances against recurrence are better. Two other possible causes of recurrence are mentioned, namely, isolated and undiscovered pus collections or sequestration of a part of the original cavity by contraction of its walls. Stevens has had the opportunity to complete the records of 123 cases, first observed at Camp Lee, Va., and later at General Hospital No. 12, at Biltmore, N. C. These fall into two groups, one of 100 treated by simple drainage, and the other twenty-three treated by preliminary aspiration until the first infection had subsided, and later by thoracotomy and use of a surgical solution of chlorinated soda. Forty-four of the first group were persistently and obstinately chronic until the Carrel-Dakin method was used. In only ten of these was the thoraco-plasty of moderate extent finally indicated. Among the cases healed under simple drainage, there were recurrences within eight months in fourteen. Ten of them were due to the hemolytic streptococcus, the original infection. Among the cases healed under the Carrel-Dakin treatment, there were eight recurrences. The efficacy of this treatment was shown by the higher percentage of the good results, and the group treated by this method showed that the pus pockets discovered were usually at some distance from the original focus. In these secondary foci there were two symptoms of value: (1) the failure to regain the normal weight or even the loss of weight, in spite of treatment, and (2) the rapid pulse rate and the moderate fever that accompanied all cases of recurrence with pus secretion. These points are illustrated by two case reports. The details of the findings in these cases are given. Stereoscopic plates were usually necessary in diagnosing the condition. The treatment depended on the character of the fluid. When it was clear and sterile, aspiration was all that was needed. In all the cases of recurrence, with the exception of one, in which the cavity was completely evacuated at the first aspiration, all the purulent fluids were drained by thoracotomy. In many instances in which there were repeated recurrences at the original site, necrotic bone fragments were found, and there was required the greatest care, and the co-operation of surgeon, interest and roentgenologist.

Tight Strictures of the Esophagus in Children Due to Lye Burns. GEORGE F. KEIPER. *The Laryngoscope,* September, 1919.

Keiper refers only to cases of stricture of the esophagus that cannot be dilated by ordinary instruments. Water hunger must be relieved. Haste in dilating the stricture is to be deprecated, as perforation may be produced. No bouginage should be performed until lateral and antero-posterior *x*-ray plates have been made. Always use an illuminated esophagoscope in bouginage. One should oil the instrument and be gentle in all manipulations. Use no anesthetics. The Jackson modification of the Guisez instrument is recommended.

Treatment may require six months or more.

A Preliminary Note on the Value of Repeated Small Blood Transfusions in Blood Stream Infections. JOHN OSBORN POLAK, Brooklyn. *The American Journal of Obstetrics,* September, 1919.

Polak has treated four cases of thrombo-phlebitis with one death, and seven cases of bacteremia, with one fatality, by this method. These were all post-partum cases. The deaths occurred in patients far advanced when treatment was begun.

Small transfusions of citrated blood are given every third day, care being taken not to use the same donor for more than two transfusions. 250-300 cc. are given very slowly. One-third gr. of morphine by hypo before the transfusion diminishes the severity of the reaction, which occurs in 60 per cent of the cases. Polak believes that small repeated blood transfusions increase the cellular elements, stimulate resistance, raise blood pressure, and hence add to the natural defense.

Pre-Operative and Post-Operative Blood Pressures. JOHN O. POLAK, Brooklyn. *American Journal of Obstetrics,* August, 1919.

After a long series of studies on blood pressures, taken before, during and after major operations, Polak presents the following conclusions:

1. That the pulse pressure is the test of the muscular strength of the individual woman's heart, when endocardial lesions can be excluded. The index of the muscle competency is shown by the relation of the pulse pressure to the systolic pressure which should be 1 to 3 or more, if the compensation is adequate.
2. That the efficiency of the kidney function is directly dependent upon the cardiac force of the individual, provided the kidney structures are normal or approximate the normal.
3. That ether anesthesia of an hour does not disturb the relation of the pulse pressure to kidney function, unless the operation is accompanied by considerable loss of blood.
4. That when the pre-operative kidney function is low, the pulse pressure must be relatively high, to compensate for the deficiency, for it does no good to add saline solu-

tion by skin or bowel, or by infusion, unless there is sufficient cardiac strength to take it up and carry the column along.

5. When both the pulse pressure and the "phthalein" output are low, or the relation of the pulse pressure to the systolic pressure is as 1 to 2, the operative prognosis should be guarded.

6. That morphine, in large doses, used during operation, seems to help in diminishing the shock, but has a definite effect in diminishing the kidney output.

7. In the majority of cases there is a moderate fall in both the systolic and diastolic blood pressure, following ether anesthesia, the inhalation of oxygen after the withdrawal of the ether diminishes this fall, but its effect is only transient.

8. In cases of shock, especially where there has been much blood lost during the operation, the fall in systolic pressure is greater than after a long operation without blood loss.

9. The pulse pressure is a better index of hemorrhage or cardiac failure than the systolic pressure, and finally, there is a constant rise in the leucocyte count in the presence of actual hemorrhage, while the leucocytes fall in shock.

A New Procedure for Total Hysterectomy, by Means of Aseptic Section of the Vagina, Without Vaginal Drainage. Dr. M. Gudin, Rio de Janeiro. *Paris Medical,* September 13, 1919.

Gudin has observed that the mortality following radical excision of the uterus for cancer is due almost always to secondary ascending pelvic infection, extraperitoneal, with the vagina as the source of entrance. In order to obviate the possibility of vaginal infection and abolish the necessity for vaginal drainage, Gudin advises the following procedure. When the uterus is freed, ureters isolated, and the vagina about to be cut across, the vagina is grasped in its entire thickness, by two large hysterectomy forceps. The incision is made between the two forceps, and the vaginal stump cauterized with actual cautery. This surface is now sterile and can be sutured and closed. Vaginal drainage is then unnecessary, and the post-operative mortality is considerably diminished.

Results of the Examination of the Prostrate and Vesicles in 125 Cases With Negative Venereal History. George Gilbert Smith and Henry Klein, Boston. *Boston Medical and Surgical Journal,* September 4, 1919.

In order to determine in what percentage of cases arthritis was due to focal venereal infection the authors present detailed statistics of their study.

Of the patients whose examinations are recorded, 107 were men between the ages of 20 and 30; 15 were between 30 and 35, and three were older than 35. In this study, age seemed of no importance. The men were questioned carefully as to the possibility of a past infection. Of the 388 men examined, there were only 150 who denied venereal disease. The fact, reinforced by impressions of the honesty of the men, leads to the opinion that the truth was told in all but perhaps a very few instances.

Of the 125 cases with negative venereal history comprising the series, prostatic massage produced no secretion at all in 18. In 72, the secretion expressed showed no pus at all. In 10 cases, the count showed an average of 2 leucocytes or less per field. These cases were arbitrarily considered as not showing sufficient evidence of infection to be called examples of "prostatitis." Thirteen cases gave a count of more than two leucocytes per field.

These cases may be said to have prostatitis or vesiculitis. In none of them was the examiner able to say, on the evidence of palpation, whether the prostate or the seminal vesicles were chiefly concerned. The authors were impressed by the unreliability of the information gained by palpation alone. Many cases that had no pus in the secretion had hard prostates or distinctly palpable vesicles. Others, whose secretion contained much pus, had soft prostates and vesicles which certainly did not feel indurated. It is perfectly possible that the cases with indurated vesicles or sclerosed prostates, but with no pus in the secretion, have at some time had an infection, and that this infection had died out, leaving scar tissue.

Including all the cases noted as having had no venereal disease, 16 cases out of 125 showed more than 2 pus cells per oil immersion field and might therefore be said to have prostatitis or vesiculitis. Cases with indurated vesicles but with no pus in the secretion are not included. In this series of 125 cases, therefore, about 13 per cent of the men who had no venereal disease, showed definite signs of a prostatitis or vesiculitis. In practically all of these, there were no symptoms referable to the prostatic condition, nor did it seem, in any of these cases, as if their arthritis was due to infection from this source.

Book Reviews

The Pituitary. A Study of the Morphology, Physiology, Pathology, and Surgical Treatment of the Pituitary, Together with an Account of the Therapeutical Uses of the Extracts Made from This Organ. By W. Blair Bell. Octavo; 348 pages; illustrated. New York: William Wood & Company, 1919.

This book is an excellent monograph on the pituitary gland. Originally Bell's interest in the subject lay in the relationship of this gland to the female reproductive organs but gradually his investigations led him into a study of this gland from many points of view, so that this book represents a very comprehensive discussion of the pituitary body as to its morphology, physiology, its disorders with their medical and surgical treatment; there is a final portion devoted to the therapeutic uses of pituitary extracts in general.

The first part of this volume deals with the embryology, the anatomy, both gross and microscopic, of the pituitary to which is added a full consideration of the comparative morphology of the organ. For the special student all this is important, yet to the clinician also it has a distinct value, since it makes clear why and how the anterior position, the posterior position, and the stalk of the gland have distinct origins and functions. Obviously, the next step is a detailed exposition of the physiology of the gland and this the author presents in *part two.* Here he divides the discussion under two headings: (1) investigations by physiological methods, (2) investigations by patho-physiological methods. Under (1) he considers (a) histological researches , (b) chemical examinations, and (c) injection, absorption, and ingestion experiments. Under (2) he discusses (a) operative procedures, *i. e.,* extirpations, stimulation of the pituitary, (b) operative procedures on correlated organs, (c) stimulations of the pituitary indirectly, *i. e.,* injection of toxins or bacteria parenterally or into the bloodstream or peritoneal cavity.

The physiology of the pituitary discussed in this orderly and thorough fashion makes a distinct impression on the reader. One readily understands that this organ has definite and, in some instances, measurable properties and their bearing upon the health or diseases of man is vital. Many of the results obtained after experimentation, much of which is ingenious, is quite convincing, as for instance, the effect of extracts of the posterior part of the gland upon the uterus, the bladder, and the milk-containing mammary gland. The phenomenon of tachyphylaxis, wherein a repeated dose of this extract causes a fall in blood pressure upon an initial rise from the first dose, has direct and practical significance for the clinical surgeon. And this is true to the same degree of the effects obtained by surgical changes in the gland. Bell, carefully leads us over the epoch-making work of Paulesco and of Cushing and then clearly and accurately describes how he carried out his own surgical investigations which led him to the results and interpretations enumerated by him. In the review it would lead us too far afield to dwell at length on this portion of the book, yet nothing in the volume is more interesting and valuable than these considerations, though portions may be controvertible.

The disorders of the pituitary contain, of course, the well-known clinical pictures such as acromegaly and dystrophia adiposogenitalis. In the light of the experimental studies these clinical entities take on a new significance though by no means are they thoroughly understood. The disorders of the pituitary are not all amenable to therapy but it becomes evident (as the purpose of the book plans us to see) that some disorders are distinctly remediable. Surgically, one may expect good results in extrapituitary tumors producing symptoms; medically, the use of pituitary extracts, may bring palliative and gratifying help and relief from symptoms of hyper- or hypo-pituitarism.

Not least important is it to realize that pituitary extracts are of definite value in some obstetrical conditions, for shock and collapse, as a diuretic and in a number of conditions, heterogeneous but distinct, where possibly more than one endocrine organ is at fault.

The book is intelligently illustrated with clear pictures and graphs.

Sterility in Women. By ARTHUR E. GILES, M.D., B.Sc. (Lond.), M.B., Ch.B. (Vict.), F.R.C.S. (Edin.), M.R.C.P. (Lond.), Captain, R.A.M.C., (Temp.), Senior Surgeon to the Chelsea Hosp'tal for Women; Gynecologist to the Prince of Wale's General Hospital, Tottenham. Small octavo; 227 pages; 11 illustrations. London: HENRY FROWDE, HODDER & STOUGHTON, OXFORD UNIVERSITY PRESS, 1919.

Giles' monograph is sound, complete and methodical. Perhaps because of an overplus of method and of statistics it is dry reading. The statistics of the author's own cases are rather meager for so ambitious a work—some 530 cases—but he quotes freely from the literature. Nothing new is found in this book, but it gives an unbiased review of the subject, a large bibliography is appended, and many case histories are quoted at length.

In his introduction the author mentions that the subject of sterility has assumed increased importance since so many young and vigorous men have lost their lives dur'ng the war. While this is true, the economic importance of sterility is infinitesimal when compared to the influence of prevention and of abortion. Sterility results in deprivation of the few (possibly 10 per cent) who long for children; Malthusianism has a devastating effect upon an ent're nation when carried to excess.

Atlas of Operative Gynecology. By BARTON COOKE HIRST, M.D., Professor of Obstetrics, University of Pennsylvania. Quarto; 292 pages; 164 plates; 46 figures. Philadelphia and London: J. B. LIPPINCOTT COMPANY, 1919.

The advent of an Atlas of Operative Gynecology by the author of well-known and popular text-books on gynecology and obstetrics is an event of some importance in medical literature. The author has many years of experience as a teacher and operator; therefore his views and impressions, his judgment and advice are worthy of consideration.

As Hirst says in his preface, "the text has been subordinated to the illustrations." The illustrations, though large, clearly printed in two colors and technically well executed, are frequenty wanting in detail, and in some instances are not true to nature. Therefore in some cases they may prove misleading to the student whose knowledge is derived solely from their perusal. As examples may be mentioned, Plate XXIII, in which a complete perineal laceration is depicted with the sphincter nicely contracted; in Plate XLVIII, designed to show the bladder pushed back in an operation for cystocele, the illustration shows neither the reflected bladder nor the fascial edges through which the sutures are passed. As another example, Plate CXXVIII, the concluding step in abdominal hysterectomy, shows a peritonealized cervical stump in the lower angle of the wound as if the stump had no connection with the remains of the broad ligament and pelvic wall. Plate LXI describes the sutures in the flap-splitting operation for vesico-vaginal fistula; there are no sutures overlapping the angles of the bladder wound, a step regarded as essential by all experienced operators.

It is the absence of many little wrinkles, short cuts and technical refinements, surely known to and practiced by Hirst, which disappoint the reviewer and detract from the value of the atlas.

The most important contribution of the author is a new perineorrhaphy described as "rational." It is designed, by incising both layers of the triangular ligament, to expose the levator fibers and suture them. Plate XIV shows a vertical gap in the levator sling (the patient be'ng in the lithotomy position) and a running suture closing this hiatus on each side of the vagina. The reviewer is free to confess that he has never encountered an injury of the pubo-rectal fibers running in this direction. Anatomically the gap corresponds to the interval often noted between the pubo-rectal and is chorectal portions of the levator, which doubtless may be increased by the trauma of labor, but plays a minor part in rectocele and perineal laceration. The operation, moreover, does not take into account the so common prolapse of the vagina known as high rectocele.

Hirst still advocates "intermediate perineorrhaphy," repair being practiced four to five days post-partum. He likewise considers a week of waiting in acute salpingitis usually sufficient to allow the stormy symptoms to subside.

The author opposes the tendency to operate upon prolapse by vaginal hysterectomy, and also justly considers pubiotomy an inadvisable operation. In extra peritoneal (really transperitoneal low corporeal) Cesarian section, suture of the uterine and parietal peritoneum is advised *after* delivery of the child, because the soiling of the peritoneum during operation is not to be feared while peritonitis due to the breaking down uterine wound is the real danger.

A concluding section takes up the treatment of mammary tumors, which, according to Hirst, are often brought to the gynecologist's attention.

This atlas, while containing much of interest to the specialist and advanced student who is able to pick and choose the good from the bad, requires considerable revision before it will fulfil its designated mission.

A Stereoscopic Atlas of Plastic Surgery of the Face, Head and Neck, with Case Reports. By JOSEPH C. BECK, F.A.C.S., and IRA FRANK, M.D., F.A.C.S., Chicago, Ill. St. Louis: C. V. MOSBY CO., 1919.

This unique set of stereoscopic pictures of plastic operations on the face, head and neck is intended to present a definite and simple course similar to the one that the authors gave to Medical Officers of the Army, trained at the oral and plastic schools.

Besides the stereoscopic pictures, there are brief case reports with selected illustrations. Most of the pictures in the stereoscopic atlas have been made from the cadaver which allows of greater latitude in surgical expression, but, of course, somewhat limits proper perspective.

Plastic sugery of this region can follow no definite set rules so that the student must draw upon his imagination as well as his own originality to develop new ideas. Yet it is well to let the student see the excellent work that has been done by competent men and it is for this reason particularly that this set of pictures is to be commended.

Industrial Nursing. For Industrial, Public Health and Pupil Nurses, and for Employers of Labor. By FLORENCE SWIFT WRIGHT, R. N., Bureau of Child Hygiene, New Jersey State Department of Health; formerly Secretary of the Benefit Association of the Employees of John Wanamaker, New York; and formerly in charge of Industrial Nursing for both the Cheney Brothers' Silk Mills and the Clark Thread Company. Duodecimo; 179 pages. New York: THE MACMILLAN COMPANY, 1919.

The development of industrial medicine naturally carries with it a variety of new occupations. Among these, the industrial nurse is to play an even more valuable part than has been the practice in the past.

No single manual can present the numerous fields of effort requiring investigation, supervision, or control by industrial nurses, inasmuch as this new function requires training in nursing, social service, education, sanitation, as well as familiarity with the needs and hazards of various industries. The industrial nurse stands in peculiar relation to employee, employer, and the community, and her problems become intensified in proportion to her personal interest in the welfare of each of these three.

From the first-aid room to home visitation, with the completing of records and reports, serving in various ways in connection with the hiring and "firing" of workers, to the organization of industrial nursing centers, the management of day nurseries, the oversight of industrial lunch-rooms, canteens and recreation rooms, there is a vast opportunity for variety of functions in connection with a single job.

All of these phases of industrial nursing are considered with varying degrees of detail by Miss Wright, whose experience has been such as to give her a proper perspective for viewing the entire subject, together with a familiarity that comes from practice, in all the special factors entering into the life of the industrial nurse. There is much material compactly presented which should prove of immense value to those interested in advancing the health and welfare of those who toil in mills and factories, in mines and stores, in banks and tanneries, or serving elsewhere in the common work leading to industrial progress.

Electricity in Medicine. A Practical Exposition of the Methods and use of Electricity in the Treatment of Disease, Comprising Electrophysics, Apparatus, Electrophysiology and Electropathology, Electro-diagnosis and Electroprognosis, General Electrotherapeutics and Special Electrotherapeutics. GEORGE W. JACOBY, M.D., former President of the New York Neurological Society and of the American Neurological Association; Consulting Neurologist to the Lenox Hill Hospital, New York, etc., and J. RALPH JACOBY, A.B., M.D., Fellow of the New York Academy of Medicine, Member of the American Medical and the American Medico-Psychologial Associations; Chief of Clinic, Neurological Department, Lenox Hill Hospital. Small octavo; 612 pages; 262 illustrations. Philadelphia: P. BLAKISTON'S SON & Co., 1919.

The title of this excellent work is thoroughly indicative of the scope of its subject matter. As the editors state in their preface, the original text, upon which the book is based, was written for a "System of Physiologic Therapeutics." The present volume serves to modernize the subject matter through the elimination of obsolete practices, and the description of developments and methods which have arisen since 1901.

The book is divided into six sections, dealing with electrophysics, the apparatus required for the therapeutic and diagnostic use of electricity, electrophysiology and electropathology, electrodiagnosis and electroprognosis, general electrotherapeutics and special electrotherapeutics. The large part that electricity plays in modern medicine is well described, and is presented with unusual clarity and directness. Through the excellent provision of illustrative material in abundance, there is a simplification of the text which reduces the difficulties encountered by some in the interpretation of abstract material.

Whether one be interested in the use of the sinusoidal current for the treatment of the lancinating pains of tabes, or desires to refresh his memory concerning the reactions of degeneration, or to familiarize himself with the theory of induction coils, there is a ready source of information in his thoroughly modern, well arranged, and interestingly presented volume.

The Practical Medicine Series. Comprising eight volumes on the year's progress in medicine and surgery. Under the general editorial charge of CHARLES L. MIX, A.M., M.D., Professor of Physical Diagnosis in the Northwestern University Medical School. *Volume II, General Surgery.* Edited by ALBERT J. OCHSNER, M.D., F.R.M.S., LL.D., F.A.C.S., Major, M.R.C., U. S. Army; Surgeon-in-Chief, Augustana and St. Mary's of Nazareth Hospitals; Professor of Surgery in the Medical Department of the State University of Illinois. Series 1919. Duodecimo; 624 pages; illustrated. Chicago: THE YEAR BOOK PUBLISHERS, 1919.

This volume is a critical abstract of the most important contributions to so much of the world's surgical literature in 1918 as was available for examination in this country. Most of the articles abstracted are from the publications in the Allied countries, since very few from Germany and Austria were obtainable.

The year was rich in the literature of war surgery and a digest of this material has been presented, without neglecting, however, equally important advances in civil—including industrial—surgery.

The articles are not only well selected and well arranged but are also abstracted with evident care and, many of them, with a reproduction of their illustrations.

Practical Medicine Series. *Volume I.* General Medicine. Edited by FRANK BILLINGS, M.S., M.D. Head of the Medicine Department and Dean of Rush Medical College, Chicago. *Series, 1919.* Chicago: THE YEAR BOOK PUBLISHERS.

This review of important medical progress during the past year maintains the excellent standard of its predecessors.

Books Received

Anatomical Diagrams. For the Use of Art Students. Arranged with Analytical Notes and drawn out by JAMES M. DUNLOP, A.R.C.A., Antique and Life Class Master and Lecturer on Artistic Anatomy in the Glasgow School of Art. With introductory preface by JOHN CLELAND, M.D., LL.D., F.R.S., Professor of Anatomy in the University of Glasgow. *Fourth Edition.* Small octavo; 72 pages. New York: THE MACMILLAN COMPANY, 1919.

Vicious Circles in Disease. By JAMIESON B. HURRY, M.A., M.D. (Cantab.). Author of "Poverty and Its Vicious Circles," etc. *Third Edition.* Octavo; 377 pages; with diagrams. Philadelphia: P. BLAKISTON'S SON & Co., 1919.

What We Know About Cancer. A Handbook for the Medical Profession. Prepared by a Committee (DRS. R. B. GREENOUGH, JAMES EWING and JONATHAN M. WAINWRIGHT) of the *American Society for the Control of Cancer,* and published by that society (Bulletin 14) in co-operation with the Council of Health and Public Instruction of the *American Medical Association.* Paper-bound duodecimo brochure; 54 pages.

Les Lésions des Nerfs. Traitement et Restauration. MME. ATHANASSIO-BENISTY, Ancien Interne des Hôpitaux de Paris. Duodecimo; 156 pages; 66 illustrations; paper bound. Paris: MASSON ET CIE, 1919.

Anesthésie a la Stovaïne en Chirurgie et en Médecine Vétérinaire. GUSTAVE PEROL, Médecin-Vétérinaire, Officier du Mérite Agricole. Duodecimo; 31 pages; illustrated; paper bound. Paris: MASSON ET CIE, 1919.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics, Materia Medica and Diagnosis in the Jefferson Medical College, Philadelphia. Assisted by Leighton F. Appleman, M.D., Instructor in Therapeutics, Jefferson Medical College, Philadelphia. *Volume XXII, No. 3.* 219 pages; illustrated. Philadelphia and New York: LEA & FEBIGER, 1919.

The Surgical Clinics of Chicago. Published bimonthly, *October,* 1919, *Volume 3, Number 5.* Octavo; pages, 1057-1315; 94 illustrations. Philadelphia and London: W. B. SAUNDERS Co.